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USSR Report

LIFE SCIENCES

BIOMEDICAL AND BEHAVIORAL SCIENCES

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15 May 1984

USSR REPORT
LIFE SCIENCES
BIOMEDICAL AND BEHAVIORAL SCIENCES

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AGROTECHNOLOGY

POWER OF BIOLOGICAL LEVERS

Kishinev SEL'SKOYE KHOZYAYSTVO MOLDAVII in Russian No 12, Dec 83 pp 14-15

[Account from the All-Union Conference "Adaptive Systems of Agriculture" Kishinev, 18-20 Oct 83 by Ye. Dimitrenko]

[Text] The worse the conditions, the more significance differentiated use of biological factors acquires. This, I suppose, was the main idea of this conference held in Kishinev. The conditions for agriculture are known to have been getting worse and worse in our country over the past years, if one considers droughts, severe frosts, damage done by hail, etc., which are over and above the various usual, permanent negative factors: heat shortage, decreasing soil fertility and others. In Moldavia, by the way, the dryness of the climate, combined with the uneven topography, shortage of irrigation sources and large-scale nature-transformation activity even more acutely pose the question of differentiated use of biological levers in the future development of agriculture.

"Strategy of Adaptive Plant Production" was the name of a report given at this conference by A. A. Zhuchenko, president of the MCSR Academy of Sciences and corresponding member of the USSR Academy of Sciences. Throughout Moldavia, 67 percent of the crops of the majority of agricultural cultures, on an average, depend upon nonregulated factors of the environment, and sometimes this figure reaches 90 percent, the speaker noted, and there are no hopes that natural conditions will become better in the future. As statistics show, it is also useless to anticipate an improvement of climatic conditions throughout the country as a whole. However, according to A. A. Zhuchenko, this does not predestine considerably lower productivity of our agricultural land resources in comparison to countries where the soil and climatic conditions are more favorable, and, it makes efficient use of the land, climate potential of cultivated species and other factors exceptionally important.

The fact that energy expenditure on production of food products is increasing steadily also speaks in favor of biological factors. Today, in order to receive two food calories, it requires one calorie of unsupplied energy. Fuel costs are rising, and for that reason we are already hoping for an increase in productivity of fields by virtue of technical potential, the introduction of fertilizer, etc., in the near future.

Each region has its own biological factors. Therefore, the question arises of differentiation of their usage and of the specificity of strategy of plant production for each region.

Science shows that with a gene, each living organism carries within itself a memory of environmental conditions in the process of evolution. This memory signifies the ability to adapt to environmental conditions. Each species must be placed according to its adaptive potential. Disregard for this rule in agriculture, which is seen, for example, in the inaccurate calculation of the structure of sowing areas, leads to large arrears in crops and to extended spread of dangerous pests and diseases.

On the whole, a decrease of species variety of plants threatens trouble. After all, not one species can be adapted to all natural conditions. Future plant production, the speaker stressed, will be along the line of increasing the number of cultivated species. This especially affects our country, where there are a large number of ecological niches.

Now about selection. How is this problem brought to the attention of selectioners? By increasing the potential productivity of the variety. But, as a rule, alas, only 15-20 percent of the potential productivity of it under production conditions is realized. An increasing this number considerably by introducing fertilizers, using irrigation and other technical measures does not work. As research shows, an effective means of bringing out potential possibilities of a variety is its ecological stability. And there is every reason to presume that in the future, the significance of ecological stability will increase.

In connection with this, the speaker gave special attention to problems of creating forms of plants which are adapted to stressful environmental conditions.

The significance of induced recombination in solving this problem was stressed in papers by I. V. Michurin and N. V. Tsitsin.

Orientation toward introducing adaptive systems of agriculture also requires new approaches to the organization of land-arrangement. Large fields in uneven topography, for example, do not make it possible to make efficient use of soil possibilities and other factors of nature. Losses due to irregularity of the environment significantly increase what are added due to applying fertilizers, using pesticides, etc.

The report ended with these words: Adaptive plant production is not a matter of the distant future, but a task of tomorrow, and there are no alternatives to it.

Academician Ye. N. Mishchustin, president of the commission on scientific bases of agriculture of the Presidium of the USSR Academy of Sciences, appeared at the conference with a report on soil processes and rationalization in use of nitrogen fertilizers.

The report of M. F. Lupashku, Minister of Agriculture of the Moldavian SSR and academician, VASKhNIL, illuminated problems of increasing stability of

farming in our republic. In particular, data were presented which indicated the incomparably higher possibilities today of agriculture in Moldavia in comparison with the way it was 30 years ago, in the initial years of collectivization: in 1953-54, there were 450 millimeters of precipitation and 7.9 centners of wheat per hectare and 8.5 centners of corn were collected, while in 1982-83, when there was just a bit more precipitation--460 millimeters--27.6 centners of wheat and 34 centners of corn were collected in our republic. Speaking of basic sections of the complex system of farming, M. F. Lupashku emphasized that in favorable years, it is expedient to increase the portion of winter wheat in the structure of sowing areas, and in unfavorable years, wheat should be distributed only according to good prior crops, increasing the corn area, which can maximally use summer rains. An example is this year, when even with a dry fall and spring, some collectives collected 50-60 centners of corn a hectare.

D. S. Chebotar', first secretary of the Glodjansk Raykom of the Communist Party of Moldavia, gave the report "Quality of the Land and Problems of Intensification of Agriculture in the Region". A. A. Sozinov, Academician of the UkrSSR Academy of Sciences and of VASKhNIL devoted his report to the role of genetics and selection in the fulfillment of our nation's Food Program.

S. I. Toma, academician of the MSSR Academy of Sciences, in his report "Problem of Exogenic Regulation of Adaptive Reactions of Agricultural Plants in Conditions of Large-Scale Agrobiocenoses" cited, in particular, research data showing that at low temperatures, a plant loses the ability to absorb nourishing substances, phosphorus for example, and if the weather is also cloudy, it does not assimilate potassium either. A. M. Grodzinskiy, academician of the UkrSSR Academy of Sciences, illuminated several problems of modern farming which arise due to chemical and other interactions of plants within the frame work of phytocenoses.

Conference participants were interested in the information provided by A. B. Rubin, doctor of physical-mathematical sciences, from MGU, on new methods of study of adaptive reactions of plant organisms, which were developed at the biophysics department of our capital's university, and also a report on principles of the operation of instruments created there.

F. I. Furduy, candidate of biological sciences, director of the Institute of Zoology and Physiology of the MSSR Academy of Sciences, discussed methods of increasing the adaptive potential of the livestock breeding system, on which that scientific institute is working. The conference participants were raptly interested in an experiment of the creation of breeds of agricultural animals, adapted to the extreme nature-climatic conditions of Kazakhstan. F. M. Mukhamedgaliev, academician of the Kazakh SSR Academy of Sciences and of VASKhNIL, discussed this.

Other scientists also appeared at the conference.

The tasks placed before the USSR Food Program are unmatched in scale. Like other measures planned by the CPSU for increasing the prosperity of nature, they have no analogs in the world. Accordingly, it also requires an intensive

scientific search for methods of using the vast nature-climatic possibilities of our immense motherland for the realization of the Party's plan. In the opinion of participants of the "Adaptive Systems of Agriculture" conference, the time has arrived to actively implement powerful biological levers for future intensification of agricultural production.

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CURRENT TECHNOLOGY IN RICE HYBRIDIZATION

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 1, Jan 84 pp 21-22

LOS', G. D., candidate of agricultural sciences

[Abstract] Although hybridization has been the basic method in the USSR in selection of rice, results of the procedures employed have been poor and need for acquisition of better techniques is stressed. Since 1972 the All-Union Scientific Research Rice Institute has been employing the technique of pneumo-castration in hybridization. For crossing, upper and lower ears are cut off well-developed rice plant panicles, leaving 15-25 well-developed ears in the middle part of the panicle. The flowers are castrated, at 6 to 8 AM, at an air temperature not below 20-22°C, so that the staminal threads are removed and the anthers are at the top of the ear: on the convex side of the ear, a narrow slit is cut in the flowering scale; the device used for this contains a vacuum pump which quickly removes the anthers from the ear. Panicles are pollinated on the day of castration; details of the preparation and execution of the latter procedure are presented. Since 1979, the "twel"-method has been used in pollination. Considerable success for this hybridization is claimed. Figure 1. [308-8586]

RESEARCH TRENDS AT INSTITUTE OF BIOLOGY OF LATVIAN SSR ACADEMY OF SCIENCES:
THEORETICAL FOUNDATIONS FOR IMPROVING CROP PRODUCTION

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 12, Dec 83 pp 53-56

ZENKEVICH, G. A.

[Abstract] A brief overview is presented of the fundamental studies currently being conducted at the Institute of Biology of the Latvian SSR Academy of Sciences in the areas of genetics, plant physiology, soil biochemistry, and trace element biochemistry as they pertain to improving crop harvests. Genetic studies at the population and molecular levels have already contributed to the development of hardier and more disease-resistant plants, and the implementation of the findings of genetic engineering and mathematical breeding models can be expected to have an even greater impact in the long run. Physiological research has provided new appreciation of the effects of various synthetic agents and hormones on crop quality and quantity, while studies on soil biochemistry and trace element metabolism have provided a better understanding of plant growth and development. The full practical implementation

and appreciation of such studies rests on close cooperation and interaction between the basic scientists and agricultural field workers, and only through such an approach will it be possible to meet the guidelines set by the 26th Party Congress for the USSR Food Program.

[278-12172]

UDC 632.165+633.14:581.143.04

USE OF GROWTH REGULATOR CAMPOSAN M IN PREVENTION OF LODGING OF WINTER RYE

Rye IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 12, Dec 83
(manuscript received 17 Jan 83) pp 103-106

ROMANOVSKAYA, O. I., PETERSON, E. K., KREYTSBERG, O. E. and KURUSHINA, N. V., Institute of Biology, Latvian SSR Academy of Sciences

[Abstract] Evaluation was made of the effectiveness of the growth regulator Camposan M (2-chloroethylphosphonic acid) in preventing loss of winter rye due to lodging. Camposan M was found most effective when applied in doses of 3-4 liters/hectare at the time of shoot formation or toward the end of stem formation. Rye plants so treated showed a greater resistance to lodging on the order of 1.4 to 3.4 standard scale units, which was due to a decrease in stem height by 6 to 36%. The residual concentrations of Camposan M in the grains were within the range of 0.01 to 0.25 mg/kg. In view of the very low toxicity of this agent (LD_{50} for rabbits is 5000 mg/kg, per os) and the fact that it is unstable at pH values exceeding 4.0, it appears safe to conclude that Camposan M does not present a health hazard to humans or domestic animals.

References 15: 1 Ukrainian, 3 Latvian, 8 Russian, 3 Western.
[278-12172]

SYMPOSIUM ON USE OF ENTOMOPHAGOUS ORGANISMS IN PLANT PROTECTION

Riga IZVESTIYA AKADEMII LATVIYSKOY SSR in Russian No 12, Dec 83 pp 122-124

KLIMPINYA, A.

[Abstract] A symposium on the use of entomophagous organisms for biological plant protection, entitled "All-Union Symposium on Theoretical Aspects of the Use of Entomophagous Organisms in Plant Protection," was held in Leningrad on January 25-27, 1983. Major emphasis in the symposium was placed on the need to further expand theoretical studies on the cultivation and use of entomophagous organisms. Particular attention was devoted to the biology, genetics, biochemistry and physiology of the *Trichogramma* sp., which is an efficient entomophage. The need to study the toxanomics of *Trichogramma* was also a topic of discussion in view of its regional differences and trophic specificity, as well as the problems involved in laboratory breeding of this valuable biologic agent.

[278-12172]

UDC 633.11"324":631.524.86

RESISTANCE OF WINTER WHEAT SORTS TO BROWN WHEAT MILDEW

Moscow SELEKTSIYA I SEMENOVOODSTVO in Russian No 11, Nov 83 pp 24-25

GONCHAROVA, R. Kh. and SMIRNOVA, L. A., North Caucasus Scientific Research Institute of Phytopathology

[Abstract] The goal of the present work was to study resistance to brown wheat mildew of various winter wheat sorts which were received from Southern Ukraine and Northern Caucasus institutes for thorough evaluation. They were evaluated in hot houses during various stages of development. The results obtained led to a conclusion that infection with wheat mildew had no significant effect on the mass of grains in all evaluated wheats except for the Polukarlik 3. The following order of resistance to brown wheat mildew was established: brand specific resistance: Prikumskaya 55; nonspecific resistance: KNIISKh 403, Urozhaynaya, Prikuibanskaya, Donskaya Bezostaya, Khersonskaya 552, Olimpiya; combined brand and nonspecific resistance: Parus, Donskaya Polukarlykovaya, KNIISKh 672, Obriy, Novinka 2, Brigantina, Zhemchuzhina, Lan, Mriya; those capable of slowing down the spread of disease: Odesskaya 95, Vikrotiya and Bezostaya I.

[297-7813]

UDC 632.3.01/.08

DETERMINATION OF VIRULENT PROPERTIES OF PSEUDOMONAS AND BACILLUS BACTERIA

Moscow ZASHCHITA RASTENIY in Russian No 12, Dec 83 p 32

IVANOVA, N. G., aspirant, Scientific Research Institute of KKh [Clinical Chemistry (?)]

[Abstract] A rapid laboratory method was developed for differentiation of bacteria families Pseudomonas and Bacillus. The method is based on artificial inoculation of potato discs (30 mm in diameter, 10 mm thick) with pure culture of the agent. The potato discs are placed in Petri dishes, bacteria suspensions grown in potato agar are placed in the center well of these discs and incubated for 3-5 days at 22-25°C. The virulence is determined by the size of the diameter of rotten tissue around the disc well: weakly virulent agents--up to 10 mm diameter, moderately virulent--up to 20 mm and strongly virulent ones will have a radius over 20 mm. Figures 4.

[299-7813]

UDC 633.15:631.52 + 632.4

BREEDING OF EARLY MATURING CORN HYBRIDS FOR RESISTANCE TO FUSARIAL ROT

Moscow DOKLADY VASKhNIL in Russian No 12, Dec 83
(manuscript received 23 Mar 83) pp 15-16

IVAKHNENKO, A. N., DUDKA, Ye. L., ZHURBA, G. M. and BORISOV, V. N., All-Union Order of the Labor Red Banner Scientific Research Institute of Corn Research

[Abstract] Ecological study was carried out in Central and Western Ukraine and in North Ossetia on selected inbred lines and hybrids of corn under various climatic conditions, evaluating their resistance to fusarial rot. Experimental data showed that, in general, no really immune specimens were found in the study population, but some lines and hybrids did show rather high resistance towards fusarium rot of the cob and vegetative organs of the plant studied. The degree of infection of various hybrids depended on immunological characteristics of parent plants and on early maturation. In light of the fact that fusarium rot affects the cob as well as the grain, young sprouts, root system and the stem, it is necessary to isolate genotypes combining ecologically stable resistance at all stages of development. References 7:
5 Russian, 2 Western.
[286-7813]

UDC 633.11"324":632.931

CONTROL OF POWDERY MILDEW OF WINTER WHEAT

Moscow DOKLADY VASKhNIL in Russian No 12, Dec 83 pp 38-39

GRIN', T. A., Zhitomir Agricultural Institute

[Abstract] Experiments were carried out in 1980-1982 on the experimental field "Ukraine" of the Zhitomir Agricultural Institute studying the effect of various levels of mineral nutrients, soil treatment and precursors on the development of powdery mildew. The results obtained showed that the precursors (prior crop) and the soil treatment had the greatest effect on the development of the disease. Surface treatment of the soil increased plant vulnerability in comparison to standard treatment, the greatest effect being noted with precursors of winter wheat and barley, the lowest--with corn. To control powdery mildew, the wheat plants were treated during the tillering phase with a mixture of fungicides: sulfur - 2 kg per hectare, fungozol - 0.6 and tur - 1.5 kg per hectare. A 43.5% drop of the wheat affection was achieved. Figures 2.
[286-7813]

UDC 633 "324".11.58.01/.08-036.5

RAPID BIOPHYSICAL METHOD FOR EARLY DIAGNOSIS OF FROST RESISTANCE IN HYBRIDS AND VARIOUS SPECIES OF WINTER WHEAT

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 6, Jun 83
(manuscript received 2 Dec 81) pp 43-45

GULYAYEV, G. V., DZHANUMOV, D. A. and RODIONOVA, A. Ye., Scientific Research Institute of Agriculture of Central Regions in Non-chernozem Zone, Nemchikova, Moscow Oblast

[Abstract] A biophysical method was developed for determination of frost resistance of winter wheat based on delayed fluorescence of leaves in 7-day-old seedlings, even prior to exposure to frost. The seedlings obtained from F_1 hybrids were intermediate and different in their behavior from both parents.

Three parameters of delayed fluorescence were isolated as the determining factors: P, PM and $\lambda/2$. The most frost-resistant wheat varieties based on this method were: Albidum 114 and Ul'yanovka; the least resistant was Kavkaz. This method could be used for selection of proper hybrids exhibiting strong frost resistance. Figure 1; references 13: 11 Russian, 2 Western.
[294-7813]

UDC 633"324".11:575.127.5

DEVELOPMENT OF NEW FORMS OF WINTER GRAIN CULTURES BY DISTANT INTERGENERIC HYBRIDIZATION FOR CONDITIONS PREVAILING IN KAZAKHSTAN

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 6, Jun 83
(manuscript received 19 Feb 82) pp 46-50

URAZALIEV, R. A. and KOZHAKHMETOV, K. K., Kazakh Scientific Research Institute of Agriculture, Alma-Ata

[Abstract] The goal of the present work was to develop new hybrids of wheat and triticale especially suitable for conditions prevalent in Kazakhstan, and showing valuable biologic and economic traits. This was attempted by means of intergeneric hybridization of *Aegilops* and *Secale* species with regionalized brands of *T. aestivum*. Highly productive brand Dneprovskaya 521 was used as a control. Following *Aegilops* species were used: ovata, ventricosa, triaristata, cylindrica, triuncialis, speltoides, aucheri, binucialis, umbellulata and *Secale* sereale. After 11 years of experimentation, it was established that highly productive hybrids could be obtained from *Ae. triaristata*, *Ae. triuncialis*, *Ae. cylindrica* crossed with *T. aestivum*. The genotypes produced showed increased immunity to diseases, maximal adaptation to extreme climatic conditions and grain with high protein content. An effective technique combined the complex step-wise crossing and a saturation crossing with direct selection of desired genotypes concurrently under different soil-climatic conditions. Figures 4; references 9: 7 Russian, 2 Western.
[294-7813]

VARIABILITY AND COMBINING ABILITY OF PRIMARY ROOT SYSTEM INDICES OF SOFT SPRING WHEAT UNDER CONDITIONS PREVAILING IN SIBERIA

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 6, Jun 83
(manuscript received 22 Jun 81) pp 51-54

GUDINOVA, L. G., KALASHNIK, N. A., GAMZIKOVA, O. I., ANTIPOVA, G. P. and KACHUR, O. T., Siberian Scientific Research Institute of Agriculture, Omsk

[Abstract] The goal of the present study was to investigate the development, variability and combining ability of primary root system of various brands and hybrids of soft spring wheat as a function of agrotechnical measures and meteorological characteristics of vegetation under conditions of Western Siberia. The study included seven sorts of spring wheat and ten F_1 hybrids.

During the two leaf phase, the plants were dug out, the roots were washed and their length and total mass were determined in the air-dried state. The number of primary roots was the same in parent and hybrid plants. The variability of the length and mass of the root system was affected by meteorological conditions and agricultural measures. The genetic effect determining the indices of primary root system varied with the conditions of growth development. Optimal development of the root system was observed during non-compact planting. The effect of dominating and nonallel interaction of genes was increased under conditions unfavorable to root development. The optimal combining ability in respect to the indices studied was shown by the following sorts: Atlas 66, Omskaya 9, and Tselinnaya 20. These sorts could serve as starting materials for selection of improved primary root systems. Figure 1; references 6 (Russian).

[294-7813]

PROTEIN MARKERS OF ALIEN GENETIC MATERIAL RESPONSIBLE FOR WHEAT RESISTANCE TO RUST AND POWDERY MILDEW FUNGI

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 6, Jun 83
(manuscript received 28 Jul 82) pp 83-87

DUKHAREV, N. A., SINICOVETS, M. Ye. and TYUTEREV, S. L., All-Union Scientific Research Institute of Plant Protection, Leningrad-Pushkin

[Abstract] The goal of the present work was to investigate the possibility of marking alien genetic material through the grain protein in substituted wheat-agropyron lines resistant to rust and powdery mildew fungi. Using the electro-phoretic approach, the glyadins of resistant and susceptible lines towards rust and powdery mildew fungi of the wheat lines Saratovskaya 29 with additional and substituted chromosomes from Agropyron intermedium were studied. It was

shown that glyadin components γ^1 and ω_2^7 are markers for agropyron chromosome in substituted lines of Saratovskaya 29 wheat, which are resistant to rust and powdery mildew fungi. If the resistance to rust and powdery mildew fungi in wheat hybrid is related to the presence of agropyron chromosomes, then the glyadin components marking this alien material may serve as protein markers for disease resistance. Figure 1; references 17: 6 Russian, 3 Czech, 8 Western.

[294-7813]

UDC 633.15:631.528.62:631.524.86

EXPERIMENTAL MUTAGENESIS IN SELECTION OF CORN FOR IMMUNITY TO DISEASES

Moscow SELEKTSIYA I SEMENOVOVODSTVO in Russian No 1, Jan 84 pp 32-33

NAVROTSKAYA, N. B., MORGUN, V. V., INGLIK, P. V., CHUCHMIY, I. P. and CHIZMAR, B. B.

[Abstract] The southwestern areas of the Ukraine and, also, other zones of the nation, are subject to especially harmful diseases including stalk and root rots, smuts, northern helminthosporiosis and ear fusariosis; pests include stalk moth, Swedish fly and, in individual years, plant lice. Hybrids damaged by stalk and root rot cannot be harvested by machines. Selection of resistant crops requires resort to correspondingly strong initial varieties. Since 1977, scientists at the Zakarpathian and the Cherkassk State Agricultural Experimental Stations and at the Institute of Molecular Biology and Genetics, (IMBG) have been cooperating in the development of new lines of corn with appropriate biological and commercial traits, fast-maturing and disease-hardiness. In addition to commonly-employed procedures for selection, they have stressed use of experimental mutagenesis. The IMBG has used the chemical mutagens NEM, NMM, NENG, NDMM and DAB. The Zakarpathian station has developed diseases of the nature indicated above and has selected sorts (151) with desirable immunities. The authors have participated in the selection of disease-resistant strains in 1981-1982; in all, 310 hybrids were studied (obtained from crossings of 67 mutant lines). They isolated 34 effective combinations. Their new mutant lines are being widely used in the (Soviet) Food Program.

[308-8586]

UDC 581.143.6:633/635

IN VITRO PLANT TISSUE CULTURE IN AGRICULTURE

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 5, May 83
(manuscript received 3 Feb 83) pp 3-7

BUTENKO, R. G., Institute of Plant Physiology imeni K. A. Timiryazev,
USSR Academy of Sciences, Moscow

[Abstract] A review is provided of in vitro technology for plant tissue and cell culture and the practical applications that such techniques may have for agriculture in general and crop improvement in particular. In addition, cultivation of medicinal plants can provide a better biochemical and genetic understanding of the synthetic steps and of the means by which drug production can be controlled. However, the most immediate application lies in biochemical genetics and the creation of somatic hybrids, with attendant evaluation of their potential usefulness in agriculture. References 18: 9 Russian, 9 Western. [298-12172]

UDC 633.111.1"321":631.523.4

REFERENCE COEFFICIENTS IN SPRING WHEAT BREEDING

Moscow SELEKTSIYA I SEMENOVOZDSTVO in Russian No 10, Oct 83 pp 8-9

ZHUZHUKIN, V. I., senior scientist, Southeastern Scientific Research Institute of Agriculture

[Abstract] A number of reference coefficients were evaluated for their significance in the breeding of spring wheat varieties under different geographic and climatic conditions. The factors evaluated included the grain content in ears, number of blossoms on spikelets, weight of 1000 grains, duration of ear formation, etc. Evaluation of the correlation coefficients for the various factors indicated that the grain content per ear was of primary importance, followed by the weight of 1000 grains and the other indicators of wheat productivity. [295-12172]

UDC 631.544.45:631.527

HYDROPONIC APPARATUS IN PHYTOTRON FOR LARGE SCALE ASSESSMENT OF WHEAT RESISTANCE TO RUST

Moscow SELEKTSIYA I SEMENOVOZDSTVO in Russian No 10, Oct 83 pp 14-15

DYATLOV, V. A., candidate of technical sciences, ROZOV, N. F., candidate of agricultural sciences, and SOLOMATIN, D. A., candidate of biological sciences

[Abstract] Description is provided of the use of a hydroponic installation in a phytotron for the evaluation of wheat resistance to stalk and brown rust

disease. The use of such an approach to phytopathologic investigations offers the advantages of a highly controlled environment with relatively small space requirements and much more rapid results. The plants develop and mature more rapidly and reach the desired stage of physiological development and disease susceptibility in 17 days, rather than 21 days in soil-filled pots. In addition, the accuracy and reliability of the data are significantly improved, and the labor and time cost factor is reduced from 78 to 17 kopecks per sample. Figures 1.

[295-12172]

RESULTS AND PERSPECTIVES IN WINTER WHEAT BREEDING

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 10, Oct 83 pp 41-43

VASILENKO, I. I., candidate of agricultural sciences

[Abstract] A meeting on the breeding of winter wheat was held at the Karabakh Scientific and Experimental Base of the Institute of Genetics and Breeding of the Azerbaijan SSR Academy of Sciences in June 1983. Special emphasis at the meeting was accorded to the breeding of highly frost- and drought-resistant winter wheat varieties, in combination with desirable traits with respect to lodging and high quality grain. A number of talks dealt with laboratory and field studies and summarized the results of genetic, biochemical, and physiological studies, as well as immunity against various pathogens. Attention was also given to the development and testing of new varieties in the 1983/1984 season.

[295-12172]

ISOGENIC WHEAT LINES IN GENETIC AND BREEDING STUDIES

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 10, Dec 83 pp 44-46

LAVRINENKO, G. T., candidate of biological sciences

[Abstract] A conference was held in 1983 on the use of isogenic lines of wheat in genetic and breeding studies which was organized by the All-RSFSR Branch of the All-Union Agricultural Academy imeni Lenin, the Volga Branch of the All-Union Society of Geneticists and Breeding Experts and the Belorussian Scientific Research Institute of Agriculture. The various speakers underscored the fact that the use of such lines makes it possible to evaluate the effects and ecologic significance of individual genes and their various combinations. A number of communications dealt with the relationships among the genes and the consequent effects on various traits, such as productivity, immunity, biochemical and physiological characteristics, and so forth.

[295-12172]

BIOCHEMISTRY

UDC 631.811+631.458

OPTIMIZATION OF PLANT MINERAL NUTRITION: RESEARCH AND PRACTICE

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 12, Dec 83
(manuscript received 11 Mar 83) pp 69-75

UPITIS, V. V. and NOLLENDORF, A. F., Institute of Biology, Latvian SSR
Academy of Sciences

[Abstract] The results of certain studies conducted on mineral nutrition of plants at the Institute of Biology of the Latvian SSR Academy of Sciences are summarized. Studies on crops cultivated on various soils and conditions, including peat moss, led to the definition of mineral concentrations that are beneficial and toxic, and on elucidation of the adverse effects of inadequate mineral supplies. The studies were also expanded to include the mineral metabolism and mineral requirements of algae for optimal growth. In general, these studies demonstrated the utility of all-encompassing studies designed to cover all factors favoring optimum plant growth which can be used to improve crop quality under field conditions. References 12 (Russian).
[278-12172]

BIOTECHNOLOGY

UDC 581.133.8:582.264

NUTRIENT MEDIA FOR CHLORELLA WITH BALANCED MACRO AND TRACE ELEMENTS

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian № 12, Dec 83
(manuscript received 14 Jan 83) pp 107-112

UPITIS, V. V., NOLLENDORF, A. F., PAKALNE, D. S. and TRAMA, S. A.,
Institute of Biology, Latvian SSR Academy of Sciences

[Abstract] Studies were conducted on determining the optimum concentration and balance of macro (N, P, K, Mg, S) and trace (Fe, Mn, Zn, Cu, Mo, B) elements in the nutrient media designed for chlorella cultivation. The experiments also included evaluation of cation/anion balance to maintain the optimum pH range (5-8), and stabilization of pH by $3\text{MgCO}_3 \cdot \text{Mg}(\text{OH})_2 \cdot 3\text{H}_2\text{O}$. Several media formulations that have been shown to be effective are described, based on an analysis of the chlorella biomass. Determination of the various elements in the chlorella requires acidification of the nutrient medium to pH 3.5-3.8 with citric acid and mixing for 15-20 min to eliminate salt precipitates, and several washings of the cells with distilled water. References 4 (Russian). [278-12172]

UDC 621.327.53+582.264

SODIUM VAPOR LAMPS FOR ARTIFICIAL ILLUMINATION IN CHLORELLA CULTIVATION

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian № 12, Dec 83
(manuscript received 27 Jun 83) pp 113-117

UPITIS, V. V., NOLLENDORF, A. F., PAKALNE, D. S. and TRAMA, S. A.,
Institute of Biology, Latvian SSR Academy of Sciences

[Abstract] Evaluation was made of the use of new Soviet high-pressure sodium vapor lamps for illumination of chlorella cultures. The results showed that illumination with the sodium lamps increased chlorellar production 1.5 to 3-fold in comparison with the standard DRL lamps. The new sodium lamps have a broad emission spectrum which produces white light, produce more than 100 lux/W, and have a long lifetime (6000 h). Figures 4; references 20: 14 Russian, 6 Western. [278-12172]

UDC 574.64:582.232

EFFECT OF SOME HEAVY METALS ON GROWTH OF BLUE-GREEN ALGAE *SYNECHOCYSTIS AQUATILIS*

Moscow BIOLOGICHESKIYE NAUKI in Russian No 11, Nov 83
(manuscript received 1 Feb 82) pp 55-58

SHAVYRINA, O. B. and GAPOCHKA, L. D., Department of General Ecology and Hydrobiology, Moscow State University imeni M. V. Lomonosov

[Abstract] A study of the toxic effect of copper, chromium and mercury on the growth of a blue-green algae *Synechocystis aquatilis* culture showed chromium to be the least toxic for *S. aquatilis* as judged by the change of integral curve of growth of the culture and the percent relationship of live and dead cells in it. Toxicity of copper and mercury was about the same. Low concentrations of chromium and copper stimulated growth of the culture only at the beginning of the experiment. Figure 1; references 13: 6 Russian; 7 Western.

EPIDEMIOLOGY

UDC 616.98:579.842.14]-07:616.155.32

NUCLEOLAR APPARATUS OF PERIPHERAL BLOOD LYMPHOCYTES IN TYPHOID CASES

Moscow SOVETSKAYA MEDITSINA in Russian No 12, Jan 83
(manuscript received 30 May 83) pp 34-38

KOZINETS, G. I., professor, IL'INSKIY, Yu. A., professor, SOKOLOVA, L. V., POGOREL'SKAYA, L. V. and POGORELOV, V. M., Chair of Infectious Diseases, 2nd Moscow Medical Institute imeni N. I. Pirogov; Laboratory of Hemocytology and Experimental Chemotherapy of Leukemias, Central Scientific Research Institute of Hematology and Blood Transfusion, USSR Ministry of Health, Moscow

[Abstract] Histological and cytochemical studies were conducted on the nucleolar apparatus of peripheral blood lymphocytes of 30 healthy subjects, 20 patients with typhoid fever, and 9 typhoid carriers (5 to 20 years), since marked changes in this apparatus had previously been observed in infectious mononucleosis, meningococcal infections, and other infectious diseases. Whereas in the normal control subjects the percentage of homogenous, ring-like, and punctate nucleoli was distributed as follows: 3, 91 and 6%, respectively, the corresponding figures for the patients and the carriers assumed a different pattern, i.e., 21.50-30.70, 55.14-63.89, and 12.90-15%. Furthermore, the mean number of nucleoli per nucleus in the healthy subjects was 1.11; in the patients this parameter ranged from 1.33-1.42, and in the carriers this figure was 1.27. These statistically-significant figures indicate that a profound change occurs in RNA metabolism which, in all probability, reflects activation of immunogenesis. Figures 3; references 15: 1 Czech, 13 Russian, 1 Western.

[353-12172]

CURRENT STATE OF SOVIET MYCOBACTERIOLOGY

Moscow SOVETSKAYA MEDITSINA in Russian No 1, Jan 84 pp 64-68

ZYKOV, M. P., professor

[Abstract] The current state of Soviet mycobacteriology was summarized at a meeting held in Leningrad to commemorate the centennial of R. Koch's address on the "Etiology of Tuberculosis", delivered on March 24, 1882. Soviet research and clinical contributions to this field have been multifaceted and continue to grow in importance. At the present time, all aspects of mycobacterial genetics, pathogenicity, metabolism, and drug effects are being actively investigated, and great strides have been made toward control and eventual eradication of this group of infectious disease, particularly tuberculosis, in the USSR.
[352-12172]

ISOLATION OF TICK BORNE ENCEPHALITIS VIRUS FROM MALARIA TRANSMITTING MOSQUITOES

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR. SERIYA BIOLOGICHESKAYA I KHIMICHESKAYA in Russian No 6, Nov-Dec 83 (manuscript received 22 Apr 83) pp 62-63

CHUMAKOV, M. P., TIKHON, Ye. I., SEMASHKO, I. V., SPASSKIY, A. A., KONOVALOV, Yu. N. and RUBIN, C. G.

[Abstract] Some 15,479 adult Anopheles maculipennis mosquitoes were collected in Moldavia in the summer of 1982 and examined for their ability to serve as carrier of tick borne encephalitis virus. Using suckling mice as bioindicators, two strains of tick borne encephalitis virus were isolated as well as five strains of Batai (Bunya-Zberoa) virus, all identified serologically and by plaque inhibition on pig embryo kidney cells. Of particular interest was the fact that the tick borne encephalitis virus was also isolated from male mosquitoes, indicating transovarial transmission in this species, or infection of the larva in ponds and streams. References 6 (Russian).
[301-12172]

FOOD TECHNOLOGY

UDC 631.52

IMPROVED BREEDING METHODS IN GENETICS LABORATORY OF INSTITUTE OF BIOLOGY OF LATVIAN SSR ACADEMY OF SCIENCES

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 12, Dec 83
(manuscript received 26 May 83) pp 57-68

DISHLER, V. Ya. and RASHAL', I. D., Institute of Biology, Latvian SSR Academy of Sciences

[Abstract] A review is provided of current research in the genetics laboratory of the Institute of Biology of the Latvian SSR Academy of Sciences, which at the present time follows three fundamental trends: 1) Genetic basis of breeding for desired immunity, 2) Enhancement of recombination frequency, and 3) Development of the theoretical basis of breeding. The genetic studies on immunity have concentrated on the resistance of barley to powdery mildew and smut, a number of races of the pathogenic agents have been identified and new varieties of resistant barley have been bred. Evaluation has been made of a variety of chemical and physical agents that promote recombination in intra-species hybridization of higher plants, such as peas, tomatoes, and barley, which resulted in new varieties combining a number of desirable traits. Studies on the theoretical aspects of breeding have concentrated on genotypic characteristics of quantitative traits in plant populations, and the use of multimeric statistical analysis for evaluating trait interactions. References 55: 1 Latvian, 48 Russian, 6 Western.

[278-12172]

UDC 664.8:636.087.25

RESOURCES FOR INCREASED PRODUCTION OF FOOD PRODUCTS

Moscow KONSERVNAYA I OVOSHCHESUSHIL'NAYA PROMYSHLENNOST' in Russian No 1, Jan 84 pp 38-40

KUZNETSOVA, N. A., candidate of technical sciences, Belorussian Branch of All-Union Scientific Research Institute of EKT [unknown abbreviation] and AR'YAYEVA, S. V., director, Pruzhansk Fruit Preservation Combine

[Abstract] An increase in food resources should be achieved by increased purchasing of agricultural produce, by production of food products at various

enterprises, improvement in marketing and overall intensification of all branches involved in food delivery. In recent years the cooperative food industry improved considerably, the canning industry being among the leaders. Fruit and vegetable canning increased by 62.5% in comparison to 1985. The assortment of canned produce is increasing gradually. In spite of the seasonal characteristics of this industry, labor utilization was at the level of 97.5%. The principal resources for increasing production of food products in Belorussia are based on increased technology, maximum utilization of equipment during off-season periods and organization of secondary outlets for food processing byproducts such as preparation of materials for fattening of cattle. [285-7813]

SCIENTIFIC BASIS OF FOOD PROGRAM

Kishinev SEL'SKOYE KHOZYAYSTVO MOLDAVII in Russian No 11, Nov 83 pp 4-7

OVCHINNIKOV, Yu. A., academician, Vice-President of USSR Academy of Sciences

[Abstract] Ever since the discovery of DNA, decoding of the protein α -spiral and determination of the structure of insulin, the biological sciences continued to develop at a rapid pace. This development was strongly supported by government authorities, in accordance with the decisions of the Supreme Soviet of the CP USSR. From the agricultural point of view, the USSR is located in a poor climatic zone which makes it impossible to cultivate the major part of its territory. Science, then, must take over the lead to improve the yield of agricultural products. A very important role in this respect is played by genetic studies leading to new hybrids adaptable to various soils, climatic conditions, resistant to diseases, etc. Future studies will rely heavily on molecular genetics and genetic engineering. Although the first successes are to be expected in plants, work is also underway to improve animal production. Beside improvement in feed, attention is also directed towards new drugs and vaccines as well as to plant-protection agents, new pesticides, bacterial insecticides, pheromones, etc. Special attention must be paid to storage technology including irradiation of the products. All of this will be effective if adequate coordination and planning are applied to avoid duplication and diffusion of effort. [306-7813]

IMPORTANT FACTOR IN SOLVING PROBLEMS OF USSR FOOD PROGRAM

Moscow MASLO-ZHIROVAYA PROMYSHLENNOST' in Russian No 11, Nov 83 pp 13-15

KOPEYKOVSKIY, V. M., candidate of technical sciences, ARUTYUNYAN, N. S., doctor of technical sciences, MARTOVSHCHUK, Ye. V., candidate of technical sciences and KHADKEVICH, A. N., candidate of philosophical sciences, Krasnodar Order of the Labor Red Banner Political Institute

[Abstract] Possibilities of the use of rice middlings to help solve problems related to the USSR Food Program are described and discussed. Efficient reprocessing is suggested for the purpose of producing rice-oil from which valuable components could be extracted and used as independent products. Possibilities of the use of rice-oil and meal in the balanced-fodder industry are presented. The inadequacy of the present USSR technology in this respect is pointed out and steps for producing the technology required are outlined. Estimates of the economic effect of the use of rice middlings are presented.

[334-2791]

MICROBIOLOGY AS AID TO FOOD PROGRAM

Moscow EKONOMICHESKAYA GAZETA in Russian No 57, Dec 83 pp 1-2

Review

[Abstract] One of the key problems being solved by the Food Program is the increase in production of animal breeding by increased feed base and more rational utilization of the existing resources. The existing methods can produce only about 2/3 of the required protein needs; the remainder must come from development of microbiological technology. Nutritional yeasts and protein concentrates contain high levels of total proteins; industrial base is being developed for their production from wood plants and from paraffin extracts. During their growth on petroleum hydrocarbons, yeast cells accumulate large quantities of lipids which could be utilized in many industrial applications. One of the most urgent tasks is the development of fully-automated equipment for these processes. Unfortunately, in this area there are many shortcomings. To increase the starting material resources, processes must be developed based on utilization of natural gas and synthetic alcohols (methanol and ethanol). To enrich the feed in their content of amino acids, lysine is produced commercially with excellent results. Production of other aminoacids is still in research stages where genetic engineering technology is being introduced.

[310-7813]

CONTRIBUTIONS OF INDUSTRIAL HYGIENISTS TO USSR FOOD PROGRAM

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 12,
Dec 83 (manuscript received 12 Aug 83) pp 1-5

KUNDIYEV, Yu. I., Institute of Labor Hygiene and Occupational Diseases, Kiev

[Abstract] A discussion is presented of the role of industrial hygienists in improving the quality of life and working conditions of the rural population in the USSR. Research and practical experience gathered at Kiev, Kishinev and Riga hygienic and medical establishments have demonstrated the value of hygienic assessment of the working and living conditions of agricultural workers, including farm machinery operators, and have resulted in the formulation of new and binding standards of safety and health protection. This has been reflected in a general reduction in occupational morbidity of the rural population and, concomitantly, an increase in work productivity. At the same time recognition is given to the fact that much more remains to be done to assure the agricultural workers of an optimum working and living environment.

References 5 (Russian).

[291-12172]

GENETICS

RESEARCH ON GENE ENGINEERING AT INSTITUTE OF EXPERIMENTAL BIOLOGY IN ARMENIA

Yerevan KOMMUNIST in Russian 18 Jan 84 p 4

[Article by A. Bogatskaya: "The Right to Research--Young Scientists"]

[Text] Everything in the laboratory--the equipment and furnishings--bear the mark of a search. That is expressly where the miracle occurs of penetrating into the sanctum sanctorum of the living cell, its genetics.

The term, gene engineering, emerged relatively recently. And already there are several scientific departments working in this field. They include the team of the Laboratory of Molecular Enzymology at the Institute of Experimental Biology, Armenian Academy of Sciences. Gene engineering and biotechnology are presently the leading edge of biological science.

The occupations of people working in this field and the specialists who have devoted themselves to the study of this new problem are also young. The average age of the laboratory staff concerned with gene engineering does not exceed 30 years.

Nune Ambartsumyan, candidate of biological sciences, senior scientific associate and group leader, tells us:

"Gene engineering harbors enormous reserves, including those pertaining to the control of agricultural pests, the struggle to increase livestock productivity, improvement of products put out by the medical pharmaceutical industry. Our task is to make genes 'work' for man."

To subordinate genes means to alter the genetic structure of a living cell, to secure and enhance beneficial traits. This is the direction, which the efforts of the laboratory staff are following. In particular, studies are currently in progress on the transfer of the gene of a microorganism responsible for synthesis of a toxin that selectively affects agricultural pests. This work has important implications to the national economy, since the biological method of controlling pests is more effective from the standpoint of environmental protection than the chemical method. In store is a large scale applied project, which will be worked on together with the staff of the Institute of Molecular Biology, USSR Academy of Sciences.

Research is being conducted on the molecular level. But there are some things that one can see with the naked eye: a test tube with cloudy sediment at the bottom, that's the mysterious DNA itself, the genetic material of one of the bacteria. And here are the bacteria, colonies of them, specially cultivated loose, whitish, tiny clumps. Next we see an instrument for electrophoresis, to separate nucleic acids; there is also apparatus for precipitation, isolation and separation of DNA and RNA, as well as units for working with isotopes.

N. Ambartsumyan talks about his work with enthusiasm, trying to explain clearly the essence of the problem.

Professor Zh. Akopyan, who is the supervisor of the work and heads the laboratory, talks about the young scientist, commenting on her initiative and vigor. She is enthused with her job and often stays in the laboratory very late.

Numerous experiments are performed. The special literature, periodicals, articles are pored over, the knowhow of fellow workers in the field is studied. The scientific interests of the laboratory are broad and on many levels. The laboratory staff maintains close ties with the scientists at the Institute of Microbiology of this republic's Academy of Sciences, agricultural and medical institutes. The fruitful contacts with scientists in Novosibirsk and Moscow keep them informed about research and feel the pulse of the frontline of science.

Periodically, N. Ambartsumyan visits the Institute of Molecular Biology, USSR Academy of Sciences, where she discusses results of experiments with her colleagues. She studied there and successfully completed her graduate studies, nor does she forget Moscow State University from which she received her diploma in biology. These meetings give new impetus to her creative search.

Nune Ambartsumyan is chairman of the institute's young scientist council. She puts her energy and enthusiasm into contests for the best scientific work, lectures on current problems of molecular biology and scientific conferences. There are still many "blank spaces" in the discipline with which she is involved. And it is up to the young to fill them in.

10,657
CSO: 1840/313

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VIRUSES AND GENE ENGINEERING

Moscow VESTNIK AKADEMII NAUK MEDITSINSKIKH SSSR in Russian No 12, Dec 83
(manuscript received 23 May 83) pp 67-75

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Academy of Medical Sciences, Moscow

[Abstract] Material from the literature and institutional information are used to describe and discuss various theoretical and experimental approaches to designing virus and microbial vaccines. Gene engineering vaccines of the first generation are based on the isolation of genes that code the synthesis of full-scale capsid proteins with the main antigenic determinants and on their subsequent expression in suitable recipient cells. The possibility of wide-scale use of microbiological synthesis to produce virus vaccines has not been verified but there is promise in this direction in the next 7 to 10 years. At present, eukaryotic systems based on virus vectors and animal cell cultures are being developed for this purpose. Gene-engineered vaccines of the second generation will be constructed on small segments of virus polypeptide carrying the main antigenic determinants rather on a full-dimensional virus protein. Construction of gene-engineered vaccines of the third generation may be based on artificial, very broad spectrum antigenic determinants. References 47: 10 Russian, 37 Western.

[332-2791]

UDC 612.821.2

FUNCTIONAL INDICATORS OF STATE OF MAN AND HIS CAPACITY TO WORK UNDER
MONOTONOUS CONDITIONS

Moscow BIOLOGICHESKIYE NAUKI in Russian No 11, Nov 83
(manuscript received 11 May 82) pp 45-50

SLAVUTSKAYA, M. V. and RAMENDIK, D. M., Department of Physiology of Higher
Nervous Activity, Moscow State University imeni M. V. Lomonosov

[Abstract] A modified proof-reading test was used in 24 experiments on 12 subjects ranging in age from 20 to 25 years in a study of efficiency of functioning while performing monotonous operations. Most of the subjects performed satisfactorily under various degrees of activation of the central nervous system and autonomic nervous system. Reduction of the capacity to work may occur both during reduction and during increase of the functional state of the subject in comparison with the optimum level. Worsening of the capacity to work was accompanied by changes of activation of various levels of the cerebral cortex in all subjects. Changes of the functional state of the subjects during performance of monotonous work correlated with the degree of pronouncement of all of the electrophysiological indicators studied. Individual psychophysiological characteristics must be studied in order to determine fitness for work of a given individual. Figure 1; references 14 (Russian).
[337-2791]

LASER EFFECTS

4
UDC 615.472:615.849.19].036.8

'SKAL'PEL'-1' LASER IN POLYCLINIC USE

Moscow SOVETSKOYE ZDRAVOKHRANENIYE in Russian No 11, Nov 83
(manuscript received 4 May 83) pp 42-46

RUTGAYZER, V. M. and SKOBELKIN, O. K., professors, BREKHOV, Ye. I., doctor of medical sciences, SHABLOVSKIY, O. R. and TRIZNO, T. N., 4th Main Administration of the USSR Ministry of Health; USSR Gosplan Scientific Research Economic Institute, Municipal Polyclinic No 106, Moscow

[Abstract] Use of the "Skal'pel'-1" CO₂-laser in out-patient surgery at the Municipal Polyclinic No 106 in Moscow during the last two years is described and discussed and the economic impact of its use is evaluated. The laser was used in operations on benign surface tumors, purulent-inflammatory diseases, trophic ulcers of the extremities, accidents involving the soft tissues and in some other procedures. Operations (211) were performed under local infiltration or conduction anesthesia. The economic impact of use of the laser in these procedures is calculated with consideration of the reduction of the recovery and disability period, the increase of social production achieved as a result of the reduction of disability time and the difference in costs of out-patient surgery to replace conventional surgery. These economic benefits and the medical benefits from laser surgery (reduction of hemorrhage, prevention of purulent complications, etc.) make it possible to recommend the "Skal'pel'-1" from both the medical and economic point of view. References 10 (Russian).

[336-2791]

UDC 615.849.19.03:061.3(47+57)"1983"

USE OF LASER EMISSION IN COMBINATION WITH OTHER PHYSICOCHEMICAL FACTORS IN MEDICINE AND BIOLOGY (SUKHUMI, MAY 5-7, 1983)

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 12, Dec 83 pp 59-60

KASHUBA, V. A., Moscow

[Abstract] The title conference was organized by the Commission on "Lasers in Medicine" and Section 7 of the Scientific Technical Council of the USSR Academy

of Medical Sciences. Some forty reports were read at the conference, supplemented by other communications, which dealt with the usefulness of lasers alone and in combination with other physicochemical factors commonly employed in medical procedures. The sessions dealt with laser-laser combination as well as the use of lasers with ionizing radiation, ultrasound, low temperatures, drugs, biogenic stimulants and physiotherapeutic procedures. Considerable attention was also devoted to assurance of safety of medical and research personnel handling laser devices and at risk of possible exposure to laser beams.

[291-12172]

UDC 621.039.554+633.521:581.192

EFFEFFECTS OF LASER IRRADIATION ON FIBER FLAX HARVEST AND QUALITY

Minsk VYESTSI AKADEMII NAVUK BSSR in Belorussian No 4, 1983
(manuscript received 18 May 82) pp 74-78

ARTEM'YEVA, A. Ye., Grodno Oblast State Experimental Agricultural Station,
Belorussian SSR Ministry of Agriculture

[Abstract] The seeds of seven varieties of long-fiber flax were exposed to irradiation by red (630 nm), ultraviolet (330 nm) or blue (440 nm) laser light for variable periods of time (1 to 45 min) to study effects of the exposure on harvest and the quality of the crop. Analysis of data obtained under laboratory and field conditions showed that irradiation with the different laser at equivalent power flux density values (0.3 mW/cm^2) had no statistically significant consequences in terms of germination, growth rate, fiber length or a number of biochemical indicators. There was, however, a discernible trend toward elevation of the silicon content of the seeds produced by plants derived from laser-irradiated seeds. References 11: 9 Russian, 2 Western.

[305-12172]

UDC: 591.483:599.53(262.5)

RECEPTOR NERVE ELEMENTS IN EXTRAOCULAR MUSCLES OF BLACK-SEA DELPHINIDS

Kiev VESTNIK ZOOLOGII in Russian No 6, Nov-Dec 83 (manuscript received 21 Dec 81) pp 59-63

Article by G. I. Vasilevskaya and N. I. Roman, Institute of Zoology imeni I. I. Shmal'gauzen, Ukrainsk SSR Academy of Sciences]

[Text] Delphinids that have anatomically developed and actively utilized eyes are characterized by distinct development of extraocular muscles (EOM). Their innervation is of interest in both the comparative morphological and functional aspects; however, there are no data in the literature about the structure of the receptor system of ocular muscles of dolphins.

We studied the nerve structures of EOM taken from an adult bottlenosed dolphin (*Tursiops truncatus* Mont.), common dolphin (*Delphinus delphis* L.) and porpoise (*Phocaena phocaena* L.) that inhabit the Black Sea (total of 16 animals). Material was fixed in 10% formalin or Bouin fluid. Frozen sections of the four rectus, two oblique and retractor muscles of the eye, which were excised from the orbits with peribulbar blubber (which was subsequently removed entirely), were impregnated according to Bielschowsky-Gross.

In spite of the fact that, as compared to other mammals, the range of eyeball movements is narrower in delphinids, their EOM are intensively innervated. Proprioceptors are encountered in all parts of the muscle proper, in the region of its change into a tendon and in the tendon proper. The distinctive feature of EOM innervation in the above-mentioned delphinids is the absence of true (i.e., with typical structure) neuromuscular spindles, or nonfree endings of other types, for example, Golgi-Mazzoni corpuscles, which are particularly well-developed in the rectus ocular muscles of cattle (Dogel', 1906).

Evidently, there are many more nerve endings in delphinid EOM than in other somatic muscles; this was definitely confirmed by our previous studies (Vasilevskaya, 1975). Two types of muscle fibers can be discerned in EOM: thin ones, usually on the periphery of the muscle and thick, in the central part. We failed to demonstrate any morphological differences in

afferent innervation of both, although, as we know, different types of muscle fibers differ in their contractile and electrical properties (Granit, 1973). In addition, the thick fibers of ocular muscles are responsible for rapid eye movements and the thin ones for slow tonic movements (Shumakher et al., 1971).

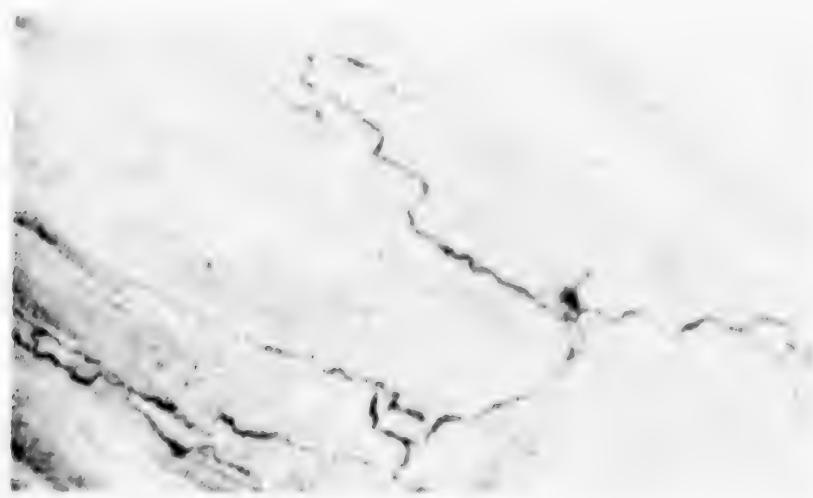


Figure 1. Free nerve endings in external rectus muscle of bottlenose dolphin eye (impregnation after Bielschowsky-Gross; magnification: objective 10x, ocular 10x)

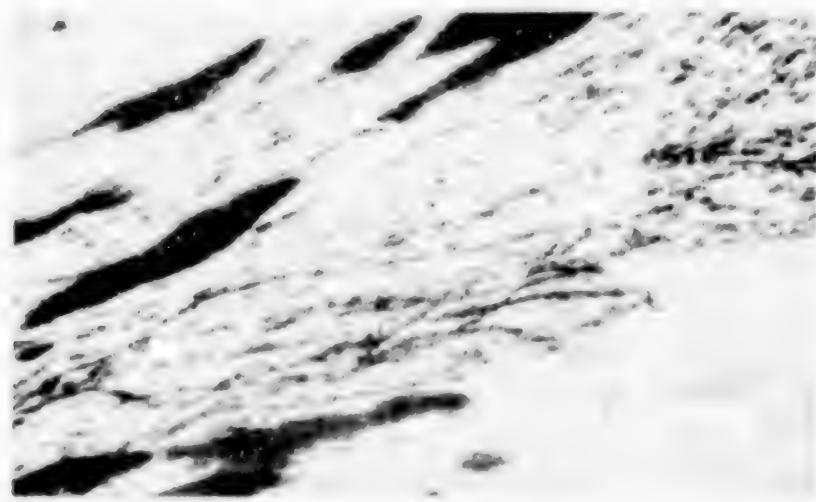


Figure 2. Afferent innervation of rectus muscle tendon of bottlenose dolphin eye (impregnation after Bielschowsky-Gross; magnification: objective 10x, ocular 8x)

Myelinated and unmyelinated fibers differing in diameter show branching in the delphinid EOM. Being markedly convoluted, they follow muscle fibers at a distance of up to half their length, then move to the tendon, where the tortuosity diminishes. The thin endings of nerve fibers entwine the muscle fibers. Many branchings passing into the tendon bend back and return to the muscle after which, branching out many times, they end freely on muscle fibers (Figure 1).

Afferent endings are found along the entire EOM, but they are the most numerous at the origin and site of attachment of each muscle. Near the transition of muscle bundles into tendinal tissue, there are complicated tendinal receptors. Several preterminal nerve fibers converge in the region of formation of the myelinated efferent fiber. They break down into finer branches that invest a large part of the tendon. The thickness of preterminal elements varies, they present marked ramification, forming tufts and loops. There are frequent extensive dilatations along their course, which are formed by accumulations of neuroplasm. Such fibers are always very thin, tapered in their terminal part, occasionally after being separated dichotomically and they usually extend over long distances. The terminals are lodged between tendinal fibers. The entire afferent system has the appearance of a receptor field (Figure 2). In some cases, such a tendon receptor is only part of a multivalent receptor that also involves the muscle fiber. In this case, the terminal fibers exit from a tendon and penetrate into the terminal segments of the muscle. There, retaining their general type of structure, they end in connective muscle tissue and on muscle fibers. In some cases, the muscular part of a receptor differs drastically from the tendinal part.

Receptors of another type are also encountered in the peripheral parts of muscles. They are formed of unmyelinated fibers that extend along the muscle fiber. The preterminal part of such nerve fibers is curved in a spiral, while its terminal part is wrapped 2-3 times around the muscle fiber. The ending terminates with a tapered or small fibrillar dilatation on the muscle. Double spirals were not demonstrable, nor were layers of rather thick connective tissue around muscle fibers invested in spiraled nerve fibers.

Although receptors of a nerve fiber of this type are scarce in peripheral parts of muscles, we paid close attention to them, striving to detect in their structure signs of myoneural spindles since, according to the data of Cooper and Daniel (1949), a very fine capsule and minor difference in thickness of extrafusal and intrafusal fibers were inherent in these fibers in the EOM of the cow, white antelope, gnu, pig, giraffe, chimpanzee and sheep. However, delphinids do not present distinct enough signs of true neuromuscular spindles, although functionally these receptors may be analogues of EOM spindles in other mammals.

Receptors of the climbing type are often encountered in polar segments of muscles. As a rule, their preterminal fibers are rather long, usually with periodic accumulations of neuroplasm. In the terminal section, the fiber splits into several terminals, each of which goes to an individual muscle fiber. The caliber of afferent fibers of such receptors is close to that of fibers of spiraled endings, and they form nerve fascicles together with them.

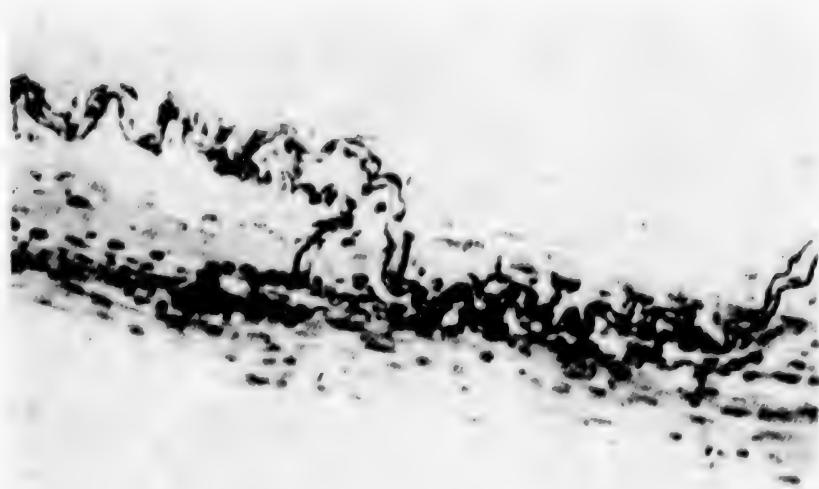


Figure 3. Nerve fiber fascicle in porpoise EOM with typical sinusoid tortuosity (impregnation after Bielschowsky-Gross; magnification: objective 10 \times , ocular 3.5 \times)



Figure 4. Afferent nerve ending in region of protoplasmic sole of end-plate in porpoise EOM (impregnation after Bielschowsky-Gross; objective 10 \times , ocular 15 \times)

One of the distinctions of the nerve fascicles supplying EOM is that they consist of fibers of different diameters. There are no more than 5-6 fibers per fascicle. Along with the thinnest nonmyelinated fibers there are thick myelinated ones. Such nerves spread over considerable distances in a muscle,

presenting sinusoidal bends. The tortuous course of fibers in fascicles is inherent in most afferent and efferent fibers. In essence, it also persists after the fascicle separates into individual fibers, and in some cases it disappears only in the terminal sections (Figure 3).

The receptors formed by these fibers in the central part of a muscle are often different from those described above. The efferent fibers diverge from the main fascicle at different angles. Some are parallel to muscle fibers or at small angles to them, while others spread perpendicularly up to the terminal part. Unmyelinated fibers are essentially very tortuous, traveling far from a nerve fascicle and ending freely in simple tapered elements, seldom in fibrils or loops with epineurial location. Myelinated fibers are minimally convoluted in the preterminal regions. Until the myelin disappears they lie almost perpendicularly to muscle fibers and only after it disappears do they separate into several fibrils which are situated on the muscle fiber in the form of brushes or arborizations. In some cases the terminals of myelinated fibers have a more complicated appearance. The ending demonstrates dichotomous separation, the forming fibrils diverge into different directions over considerable distances, and they end on different muscle fibers in the form of dilations, knobs, plates, etc.

In addition, vascular-tissular receptors, as well as structures the functional significance of which has not yet been determined, are demonstrable in the described EOM. They are represented by unmyelinated fibers of very small caliber, which accompany myelinated nerve fibers forming an endplate. The ending of such a thin fiber, which has a simple shape, is situated in the region of the protoplasmic sole plate of an efferent ending (Figure 4). Perhaps the fiber described is a receptor element and belongs to the sympathetic nervous system. Such concomitant innervation of myelinated afferent nerves had not been demonstrated previously in the somatic muscles of delphinids (Vasilevskaya, 1980). The general structure of vascular and tissular receptors made up of thin unmyelinated fibers correspond entirely to the structure of similar receptors in skeletal muscles of delphinids and other vertebrates.

A comparison of the data submitted here to descriptions of receptor elements in EOM of representatives of different classes of vertebrates warrants the conclusion that rather ancient features that are widespread among vertebrates are demonstrable in the structure of these elements in Black-Sea dolphins, as in other mammals. For example, a complicated form of endings, high concentration of unmyelinated fibers at the points of transition from muscle to tendon are inherent in afferent fibers of ocular muscles of reptiles (lizard), birds (mainly predators), in which there is complex branching of receptor fibers in EOM (Starshinova, 1968), as well as mammals differing in ecology, for example, the rabbit and cheetah (Cooper, Daniel, 1949). It should be noted that the distinctive features in EOM innervation have been identified in a rather limited number of mammalian species. Nevertheless, a comparison of our findings to data in the literature (Dogel', 1907; Cooper, Daniel, 1949) shows that both the ocular muscles of delphinids and sensory nerve endings in them are very similar in structure to those of the most diverse terrestrial mammals, in particular, ruminants, pigs, horses, dogs, bears, some primates and man.

On the other hand, there were no myoneural spindles among the receptor elements of the delphinids we studied. While this distinction is rather typical of the species we studied, it cannot be considered specific to delphinids, since such fibers are also wanting in EOM of the rabbit, dog, cat, cheetah, bear and Macaca monkey, which are representatives of different mammalian orders (Cooper, Daniel, 1949). Consequently, afferent endings that are widespread among terrestrial vertebrates are utilized for the control of EOM function in these delphinids, although the auxiliary apparatus of the eye, not to mention the optical system, is quite unique (strong retractor, distinctive palpebral structure, blood supply to EOM, vascular tunic of the eye).

The profusion of receptor endings and extensiveness of innervated regions in eye muscles of delphinids are the consequence of its high functional activity. The ability to "protrude" the eye over a distance of 10-15 mm and to "retract it," which was observed in the bottlenosed dolphin, can serve as an example (Yablokov et al., 1972). Nevertheless, the absence of myoneural fibers, which are such a refined regulator of muscular activity, cannot be viewed as evidence of drastically limited capacity of delphinid EOM to perform the function of adjusting the position of the eyeball, since "...simpler receptors, for example, such as exist in the cat, could also serve to measure the length of muscles" (Granit, 1973).

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CSO: 1840/268

MEDICINE

UDC 616-005.1-036.11-085.384-07:616.16-008.1

MICROCIRCULATORY INDICATORS IN EXPERIMENTAL THERAPY OF ACUTE HEMORRHAGE WITH PERFLUORODECALIN (BLOOD SUBSTITUTE AND OXYGEN CARRIER)

Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian No 4, Apr 83
(manuscript received 5 May 81) pp 38-41

MATVIYENKO, V. P., GUSENOVA, F. M., AFONIN, N. I., APROSIN, Yu. D. and SIDLYAROV, D. P., Central Scientific Research Institute of Hematology and Blood Transfusion, USSR Ministry of Health, Moscow

[Abstract] Therapeutic trials were conducted on perfluorodecalin, a blood substitute and oxygen carrier, using Wistar rats subjected to ca. 50% blood loss (ca. 3 ml/100 g). This degree of blood loss resulted in a fall in the BP to 10 ± 4 mmHg and closing of the capillaries. Infusion of 0.75 ml/100 g of the substitute (i.e., 25% blood volume replacement) elevated the BP to 45 ± 4 mmHg, while infusion of 1.5 ml/100 g of perfluorodecalin (ca. 50% volume replacement) resulted in a BP of 85 ± 5 mmHg. BPs of 110 ± 5 and 115 ± 5 mmHg were obtained with 75% and 100% blood volume replacements, respectively, and resulted in complete recovery of microcirculation. However, perfluorodecalin was found to enhance erythrocyte aggregation and capillary permeability. In general, however, perfluorodecalin appears to be a promising agent for the management of acute blood loss. Figures 1; references 5: 2 Russian, 3 Western.

[392-12172]

UDC 615.384.035.7

FUNDAMENTAL MECHANISMS OF ACTION OF BLOOD SUBSTITUTES AND TYPICAL THERAPEUTIC ERRORS IN THEIR USE

Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian No 9, Sep 83
(manuscript received 28 Jul 82) pp 5-11

KOZINER, V. B., doctor of medical sciences, Central Scientific Research Institute of Hematology and Blood Transfusion, USSR Ministry of Health, Moscow

[Abstract] Perusal of Soviet clinical literature shows that in many cases blood substitutes are used in cases where they are not indicated or, in fact, contraindicated. By and large, even if no immediate danger is presented to the patient in most of the cases, there are obviously cases that are complicated by inappropriate therapeutic measures. This situation stems largely

from a lack of appreciation of the specific use for which the various preparations are intended and disregard of available information. Current classification of the blood substitutes in the clinical armamentarium divides such preparations into six groups: 1) hemodynamic agents, 2) detoxicants, 3) parenteral protein nutrients, 4) regulators of acid-base and water-electrolyte equilibrium, 5) oxygen-carrier blood substituents (under development), and 6) complex blood substituents (under development). References 31: 29 Russian, 2 Western.

[358-12172]

EFFECTS OF HYPOKINESIA ON MOTOR ACTIVITY-CONTROLLING BRAIN FORMATIONS

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR. SERIYA BIOLOGICHESKIKH I KHIMICHESKIKH NAUK in Russian No 6, Nov-Dec 83 (manuscript received 10 Sep 82) pp 34-40

POSTOLAKE, D. P.

[Abstract] Electrophysiological studies on dogs and rabbits subjected to hypokinesia for three to twenty days demonstrated that the EEG patterns of brain formations specifically involved in motor functions (posteroventral thalamic nucleus, sensorimotor cortex, nucleus ruber) underwent changes, as did the EEG recording from nonspecific formations (dorsal hypothalamus and dorsal hippocampus) responsible largely for autonomic functions. In the rabbits, summary EEG and the frequencies of the individual rhythms (gamma, theta, alpha, beta) in the brain formations involved in controlling motor activity showed a diminution. In the dogs, however, a similar phenomenon was noted only in the case of the posteroventral thalamic nucleus. Variable changes were noted in the remaining structures under investigation, which were ascribed to fluctuations in the excitability and the emotional state of the experimental animals. Figures 2; references 13 (Russian).

[301-12172]

NONIONIZING ELECTROMAGNETIC RADIATION EFFECTS

UDC 614.898:614.876+614.898-036.8:616.5-001.29-084

AN EXPERIMENTAL STUDY OF THE EFFECTIVENESS OF USING A BIOLOGICAL FILM CONTAINING BARIUM SULFATE TO PROTECT THE SKIN AGAINST RADIATION INJURY

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 11, Nov 83
(manuscript received 19 Apr 83) pp 52-54

[Article by V. N. Mal'tsev and G. A. Shal'nova]

[Text] "Soft" X-rays cause the most pronounced damage to the skin and they are completely absorbed by the epidermis (L. A. Afrikanova; V. N. Mal'tsev and G. M. Avetisov). In this respect they differ from "hard" X-rays and gamma rays, which are characterized by a heightened penetration capability. Humans can come into contact with "soft" X-ray irradiation when working on devices for electronic processing of metals used for X-ray structural and X-ray spectral analyses, and also when working with high-voltage electronic instruments that are part of television and radar mechanisms (A. N. Liberman). The ⁶⁵Zn, ⁵¹Cr, ¹¹³Sn, and ²³⁹Pu isotopes can serve as sources of "soft" X-rays.

Casein biological film was proposed to protect the skin on the hands of workers employed in the atomic industry; it is used in the chemical industry to protect skin from irritation caused by chemical substances (L. A. Il'in; N. Yu. Tarasenko et al.). With the aim of increasing the effectiveness of biological film as a means for protecting the skin against "soft" X-rays, we introduced barium sulfate as one of its components. This should cause a reduction in the strength of the X-rays as they pass through the barium sulfate layer, since the protective effect is proportional to the fourth power of the atomic weight (the molecular mass of barium sulfate is 104).

The protective properties of the biological film containing barium sulfate were verified in physical and biological experiments. An RUB-140 apparatus with a BPM-200 tube was used as the "soft" X-ray source; the voltage of the current in the tube was 17 volts; the strength of the current was 20 milliamperes; and the focal distance was 29 cm. A "Phillips" instrument was used for dosimetric monitoring under the protective layer, which was applied onto a tyrilene film 0.04 mm thick. The thickness of the biological film containing the barium sulfate was 0.02-0.04 mm. The protective properties of the preparation were tested on 30 white rats, who had a 3 cm section of their tails irradiated; and on 60 guinea pigs, which had a 2x3 cm section of skin on their backs irradiated. The guinea pigs' fur was shaved a day before the beginning of the experiment.

The biological film used to protect the skin was composed of 25 g of casein, a 25 percent solution with 3 g of ammonia, 6 g of glycerine, 25 g of ethyl

alcohol, 50 g of barium sulfate, and 41 g of water. The film was applied to the skin 10 minutes before irradiation and was washed off with water after irradiation (group No 3). Animals whose skin was protected by a biological film that did not contain barium sulfate served as the control group (this was group No 2), as did a group of animals that were not protected by any substance (group No 1). Each group had 10 rats and 5 guinea pigs. The following radiation doses were used: 3000 roentgens (28.8 gram-roentgens); 6000 roentgens (57.6 gram-roentgens); 12,000 roentgens (115.2 gram-roentgens); 18,000 roentgens (172 gram-roentgens); 30,000 roentgens (288 gram-roentgens). The strength of the dose was equal to 415 roentgens/min (1.93 milliamperes/kg).

In the majority of the experiments the animals were observed for 70 days following irradiation. A clinical picture of the development of radiation injury to the skin was formed on the basis of local reactions: 1 point--hyperemia; 2 points--peeling (dry epidermitis); 3 points--scale formation (wet epidermitis); 4 points--ulcer formation (ulcerous necrotic process); 5 points--spontaneous amputation of the tail in rats or necrosis of the skin in guinea pigs. The results of the observations are illustrated in the accompanying photograph and are summarized in the table.

Dosimetric observations showed that the strength of the X-ray radiation dose dropped from 450 roentgens/min (1.93 milliamperes/kg) to 41.4 roentgens/min (0.178 milliamperes/kg) when the X-rays passed through the biological film that contained barium sulfate; and to 416 roentgens/min (1.78 milliamperes/kg) when there was no barium sulfate present; and to 369 roentgens/min (1.59 milliamperes/kg) when passing through an ordinary rubber glove.

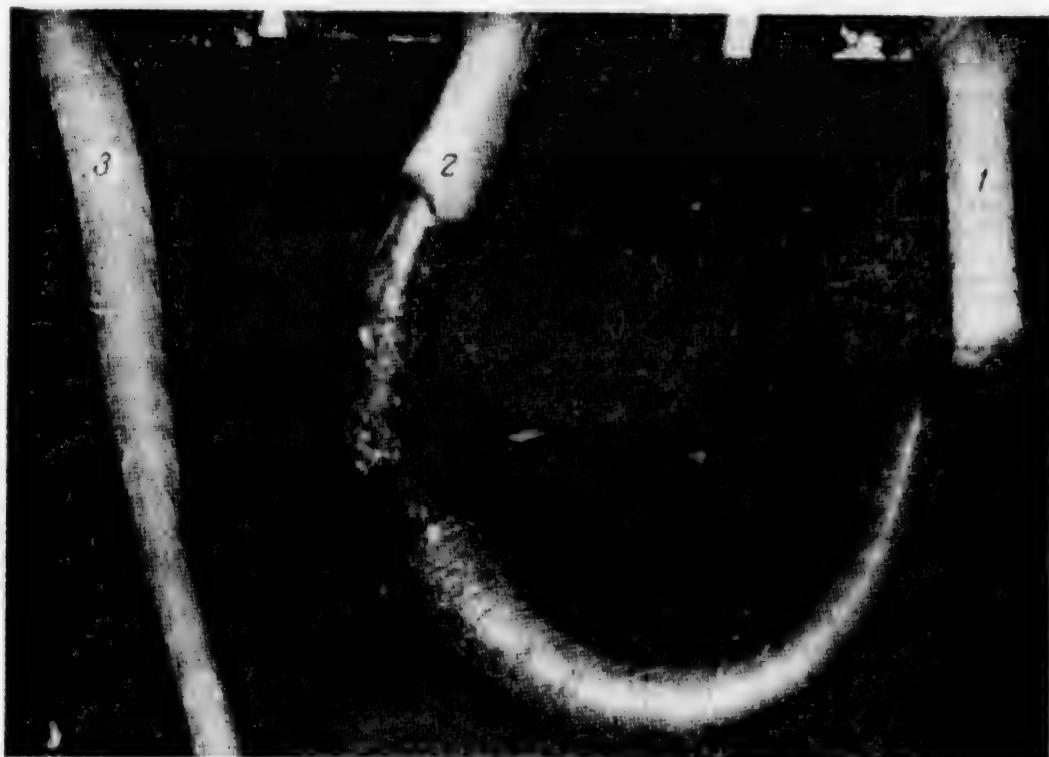
The results of the biological observations show that there was severe injury to the animals' skin in groups 1 and 2. Seven days after irradiation of the skin there was hyperemia, followed by dry and wet epidermitis. After 21 days necrotic ulcers formed on the skin; the ulcers began to heal later if the irradiation dose was between 3000 and 12,000 roentgens (28.8-115.2 gram-roentgens); if the irradiation dose was between 18,000 and 30,000 roentgens (172-288 gram-roentgens) the ulcers remained throughout the entire observation period. Two months after the irradiation trauma, the guinea pigs showed formation of chronic ulcers and loss of hair (see the table); spontaneous tail amputations occurred among the rats.

Doses of 3000-12,000 roentgens (28.8-115.2 gram-roentgens) when the skin was protected by a biological film containing barium sulfate did not elicit any external manifestations of radiation dermatitis. Dry epidermitis or necrosis was observed in several animals (in group 3) after the skin was irradiated by doses between 18,000 and 30,000 roentgens (172-288 gram-roentgens).

The results of the biological experiment agree with the data from dosimetric observations. Both the strength of the dose and the biological effect of the "soft" X-ray radiation dropped to approximately one-tenth the expected level when passing through a biological film containing barium sulfate. The intensity of the skin reaction in guinea pigs that were irradiated with a dose of 30,000 roentgens (288 gram-roentgens) under protected conditions was similar to that of control animals exposed to a dose of 3000 roentgens (28.8 gram-roentgens).

Thus, we can conclude that the biological film containing barium sulfate protects the skin from injury by "soft" X-rays by reducing the strength of the dose of ionizing radiation.

The biological film containing barium sulfate does not hinder hand movement and does not interfere with the performance of delicate technological operations. Unlike rubber gloves, the biological film can be used to protect not just the hands, but also the entire surface of the arms. Biological film containing barium sulfate can be used to protect skin on the hands of workers in the radio engineering industry; it can also be used when working on surfaces with low levels of radioactive contamination. The biological film can be washed off easily with water when the work is finished.



Results of the local action of "soft" X-rays applied in 172.8 gram-roentgen doses to a section of rats' tails (on the 42nd day of observation).

1--ulcerous-necrotic process with spontaneous amputation of the tail (group 1, no protection); 2--ulcerous necrotic process in animals protected by a biological film (group 2); 3--absence of injury in animals protected by a biological film containing barium sulfate (group 3).

Magnitude of the skin tissue reaction in guinea pigs following local exposure to "soft" x-rays, in points ($M+$)

		(3) Время после облучения, сут								
		7	14	21	28	35	42	49	56	70
№ группы	Доза облучения Р (гр)									
1	3 000 (28,8)	1.2±0.2	2.6±0.2	2.8±0.2	1.8±0.4	1.4±0.4	1.0±0.1	1.4±0.4	1.0±0.1	1.0±0.1
1	6 000 (57,6)	1.0±0.1	2.8±0.4	4.0±0.1	2.6±0.2	—	—	—	—	—
2		2.4±0.2	2.4±0.2	3.6±0.4	2.8±0.7	—	—	—	—	—
3		0	0	0	0	—	—	—	—	—
1	12 000 (115,2)	0.8±0.2	2.4±0.4	3.5±0.5	1.8±0.5	1.6±0.3	2.6±0.5	3.6±0.2	3.2±0.4	1.6±0.4
2		0.8±0.2	2.6±0.2	3.8±0.2	2.6±0.5	1.2±0.2	1.4±0.7	2.4±0.7	2.2±0.7	1.8±0.4
3		0	0	0	0	0	0	0	0	0
1	18 000 (172)	1.3±0.1	2.6±0.1	4.0±0.1	3.8±0.1	4.0±0.1	4.0±0.1	3.4±0.1	3.4±0.1	3.3±0.4
2		1.4±0.2	3.4±0.2	3.6±0.2	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	3.6±0.1	3.0±0.5
3		0	0	0	0	0	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2
1	30 000 (288)	2.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.2±0.4
2		2.0±0.1	2.8±0.2	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1
3	0	0.6±0.2	1.0±0.7	1.4±0.7	1.2±0.5	0.4±0.2	0.4±0.2	0.4±0.2	0.4±0.2	0.4±0.2

1. Group number
 2. Irradiation dose, roentgens (gram-roentgens)
 3. Time since irradiation, days

Note: — indicates that the animals were not examined

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CSO: 1840/232

UDC 616.127-005.8-036.82-085.849.112-07:[616.1-008.1+616.008.9

EFFECT OF DECIMETER WAVES ON FUNCTIONAL STATE OF CARDIOVASCULAR SYSTEM, SOME BIOCHEMICAL AND IMMUNOLOGICAL INDICES OF MYOCARDIUM INFARCTION PATIENTS DURING CONVALESCENCE

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY
in Russian No 2, Mar-Apr 82 (manuscript received 30 Oct 81) pp 9-13

SOROKINA, Ye. I., POSHKUS, N. B., TUPITSINA, Yu. Yu., VOLKOVA, L. P.,
SHUBINA, A. V. and KRASNIKOV, V. Ye., Central Scientific Research Institute of
Resort Science and Physiotherapy, Moscow

[Abstract] The goal of the present study was to determine optimal localization for the action of decimeter waves (DMW) and its intensity, to evaluate the action of DMW on the functions of cardiovascular system and on clinical biochemical and immunological indices in myocardium infarction patients during the early convalescent period. The study was carried out on 186 male patients 47.5 years old on the average, 4 to 10 weeks after infarction. When applied at the same location, no significant differences could be observed in reflex reactions or in therapeutic effect when a 20 or 40 Vt intensity was applied. Considerable differences were seen in relationship to the location of applied DMW. Optimal results were obtained with 40 Vt intensity and D_I-D_{IV} localiza-
tion. The effect of DMW through segmental-vegetative apparatus gave more pronounced results than through the endocrine system or through peripheral vessels. DMW applied under such conditions optimized reparatory processes in cardiac muscle and improved immunological reactivity of the organism.
References 9: 8 Russian, 1 Western.

[227-7813]

UDC 612.017.1-063:615.846

IMMUNOSUPPRESSIVE AND IMMUNOSTIMULATING ACTION OF DECIMETER WAVES IN PRIMARY IMMUNOLOGICAL RESPONSE

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY
in Russian No 2, Mar-Apr 82 (manuscript received 9 Sep 81) pp 13-17

BOGOLYUBOV, V. M., FRENKEL', I. D., PERSHIN, S. B., PONOMAREV, Yu. T.,
SOKOLOVA, Z. A., ZUBKOVA, S. M., KUZ'MIN, S. N., GALENCHIK, A. I. and
KOZLOVA, N. N., Central Scientific Research Institute of Resort Science and
Physiotherapy Moscow; Moscow Scientific Research Institute of Vaccines and
Sera imeni I. I. Mechnikov

[Abstract] Experiments were performed on 100 male rabbits (2.2.5 kg) to investigate the effect of decimeter waves (DMW) applied at different body sites on immunological processes during primary immunologic response. It was shown that the DMW effect was a function of the localization as well as of the ratio of the duration of DMW action to the duration of the administration of antigen. DMW effect on the thyroid gland during productive and inductive phase of immunogenesis led to immunodepression while during preceding immunization it stimulated immune response. DMW applied to the area of adrenals, regardless of the timing of such action, led to development of immunodepressive effect. Thymus was shown to participate actively in immunoresponse of an organism to DMW action; its action was dependent on the site of application. However, the role of thymus and hormonal mechanisms in primary immunological reactions needs further investigation. Overall, it was shown to be possible to manipulate the immunogenesis processes by means of DMW applied to different body sites. Figure 1; references 10: 6 Russian, 4 Western.

[227-7813]

UDC 612.82-06:615.846]-08

EFFECT OF DECIMETER WAVES ON BRAIN AND SURROUNDING TISSUE TEMPERATURE
(Experimental Study)

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY
in Russian No 2, Mar-Apr 82 (manuscript received 30 Apr 81) pp 18-22

MALIKOVA, S. N., MALYSHEV, V. L., BALAKYREVA, V. N. and GORBAN', L. G.,
Experimental Division (Director - prof. O. A. Krylov) of Central Scientific
Research Institute of Resort Science and Physiotherapy, Moscow

[Abstract] Temperature changes in brain and surrounding tissue evoked by decimeter waves (DMW) were studied on phantoms (wood shavings wetted with physiological solution), rabbits and dogs under light nembutal anesthesia and on animal cadavers. The data obtained showed that living organisms, in contrast to phantoms, exhibited a response to heat generation of DMW; this was manifested by maintenance of the temperature at certain level or by a tendency to lower it after about a 10 min exposure to DMW. Thus it was shown that there

is a functional cooling system in living organisms: increased local blood flow and a specialized cooling system for the brain. Rabbits showed considerably higher brain temperature elevation than the experimental dogs. Overall, the brain temperature upon exposure to DMW depended on the intensity and duration of DMW action as well as on the state of circulating cooling system of the animals. Figures 4; references 4: 3 Russian, 1 Western.
[227-7813]

UDC 616.12-008.331.1-092.2-085.844-032:611.81

VEGETATIVE FUNCTIONAL STATE IN HYPERTENSION DURING EXPOSURE OF BRAIN TO DECIMETER WAVES (Experimental Study)

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHENNOY FIZICHESKOY KUL'TURY
in Russian No 2, Mar-Apr 82 (manuscript received 30 Oct 81) pp 25-28

GOLINSKAYA, M. S.

[Abstract] The effect of decimeter waves (DMW) on vegetative functions in Wistar rats with experimentally induced hypertension was studied. DMW with a 80 mVt/cm² power flux density (PED) led to lower arterial pressure (AP), all the way down to the levels of control animals. This hypotensive action was accompanied by corresponding change in the frequency of cardiac contractions and in the depth and frequency of respiration. At the 400 mVt/cm² level of PED progressive lowering of maximal AP was noted, accompanied by fine bleedings in the tissues of brain, heart and mucous stomach membrane. Frequency of cardiac contractions and other indices of hemodynamics were not correlated with this hypotensive manifestation. After 5 to 7 exposures, the DMW effect of this magnitude became lethal. References 8: 6 Russian, 2 Western.
[227-7813]

UDC 616.831-005-008.64-085.844

DECIMETER WAVES IN COMPLEX TREATMENT OF PATIENTS WITH CEREBRAL BLOOD CIRCULATION INSUFFICIENCY

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHENNOY FIZICHESKOY KUL'TURY
in Russian No 2, Mar-Apr 82 (manuscript received 30 Oct 81) pp 28-31

STRELKOVA, N. I., Central Scientific Research Institute of Resort Science and Physiotherapy, Moscow

[Abstract] Decimeter waves (DMW) were introduced into the therapeutic armamentarium relatively recently. The effect of DMW on the CNS was studied in the Division of Neurology at the Central Scientific Research Institute of Resort Science and Physiotherapy for a number of years on four groups of patients: A) Parkinson's Disease Group, B) patients with sequelae of open and closed craniocerebral injuries, C) cerebral stroke patients basically of the

ischemic type and 2) patients with transitory cerebral circulation disorders. The experience gained showed that the use of DMW improved cerebral circulation and aided in development of collateral circulation. It was found that in cases of tremor Parkinsonism and in epilepsy, DMW therapy should be applied to the collarbone area. Application of DMW in early stages of injury needs further study. Obviously, a single therapeutic intervention cannot provide complete recovery; a combined treatment must be applied, advisably under conditions of a resort spa. References 11 (Russian).
[227-7813]

UDC 616.831-002:578.833.26]-085.356:577.164.15]:615.846.6

ACTION OF CENTIMETER WAVES FOLLOWED BY NICOTINIC ACID ELECTROPHORESIS IN COMBINED THERAPY OF PATIENTS WITH VIRAL ENCEPHALITIS SEQUELAE

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY in Russian No 2, Mar-Apr 82 (manuscript received 21 Oct 80) pp 32-35

YEZHOOVA, V. A., KUNITSYNA, L. A., KORNIYENKO, Ye. G., LESHCHINSKAYA, N. P., CHERFUS, I. S. and GUZ, S. Ya., Yalta Scientific Research Institute of Physical Therapy Methods and Medicinal Climatology imeni I. M. Sechenov

[Abstract] The data obtained in earlier studies which showed a beneficial effect of centimeter wave therapy (CMW) on patients (suffering from influenzal encephalitis) followed by electrophoresis of nicotinic acid were used in the present investigation of 200 patients aged 20 to 40 years old with sequelae of influenza encephalitis which occurred 4 to 11 months prior to this study. The group included 120 women and 80 men. On the basis of clinical and physiological studies, it was shown that combined administration of CMW and nicotinic acid electrophoresis had a much better effect on the therapeutic course than either of these procedures alone. The course of the disease, the bioelectric activity of brain, blood circulation, cardiac activity, metabolic and endocrinologic function and adrenal function improved under the effect of CMW. It was recommended to apply this modality in treatment of patients with viral encephalitis. References 8 (Russian).
[227-7813]

UDC 615.849.112

MICROWAVE THERAPY

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY in Russian No 2, Mar-Apr 82 pp 63-67

KULESHOVA, Z. S., Chair of Physiotherapy (Director - prof. V. M. Bogolyubov) Central Order of Lenin Institute for Advanced Training of Physicians, Moscow

[Abstract] This is a transcript of a lecture. Microwave therapy is based on the use of the energy of super high frequency electromagnetic vibrations. Both the centimeter and decimeter range waves are used. The lecturer reviewed

the current state of the equipment used to produce these electromagnetic waves, discussed the determination of dosage, personnel protective measures, etc. The mechanism of action was discussed along with a review of therapeutic methods based on literature data, organized by selected diseases. The final topic, briefly covered, concerned contraindications for CMW and DMW microwave therapy.

[227-7813]

UDC 615.47:615.847

DECIMETER WAVE THERAPY UTILIZING PORTABLE EQUIPMENT

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY in Russian No 2, Mar-Apr 82 (manuscript received 21 Jul 81) pp 68-69

SKURIKHINA, L. A., STRUGATSKIY, V. M. and USHAKOV, A. A., Central Scientific Research Institute of Resort Science and Physiotherapy, All-Union Scientific Research Center of Mother and Child Health Protection; Main Military Hospital Clinic imeni N. N. Burdenko, Moscow

[Abstract] Portable decimeter wave generators "Romashka" and "DMW-20" are produced in the USSR. Applied in a shielded cabin, these instruments generate electromagnetic vibrations up to $460 \pm 1\%$ MHz at 65 cm wavelength. Clinical application of this instrument is described ranging from treatment of bronchitis and bronchial asthma to intervention during partial remission in the therapy of stomach cancer.

[227-7813]

UDC 615.847.8:061.3(47+57)"1981"

MAGNETOBIOLOGICAL SEMINAR

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY in Russian No 2, Mar-Apr 82 pp 72-73

KHOLODOV, Yu. A., Moscow

[Abstract] A magnetobiological seminar was convened during the 15th All-Union Conference on Physics of Magnetic Phenomena held in Perm during 8-11 Nov 81. I. M. Kirkovo noted that this rapidly-advancing technique can now be applied to biological systems with different levels of organization. Ye. I. Kondorskiy highlighted potential application of this technique, challenging physicians to apply this mode of therapy. Yu. A. Kholodov discussed magnetic fields of biological objects. R. P. Kirkut and M. E. Liyeva covered applications of magnetic fields in neurosurgery. L. L. Reznikova discussed construction of magnetic field generators for medical purposes. V. N. Loshchikova and V. P. Ivanchenko reported on the effect of magnetic fields on temperature changes of human bodies at the site of instrument contact. And finally, Ye. I. Kondorskiy reported the work of S.B. Norina and A. N. Shalygin of the effect of heterogenic magnetic field on human blood erythrocytes.

[227-7813]

PERCEPTION OF RADIOWAVES WITHOUT APPARATUS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 29 Jan 84 p 4

RODIKOV, V., candidate of technical sciences

[Abstract] A popular discussion is presented of the effect of radiowaves, in the environment, impinging on man and mammals, in daily life. Phenomena are cited, e.g., individuals who apparently hear radio advertisements picked up by a receiver in their teeth, communications received by flowers (Ya. Narkevich-Iodko, 1896, Minsk) or palm trees, chlorophyll as a typical semiconductor (A. Terenin and A. Krasnovskiy), reception of radiowaves perceived by people living near radiostations, radiowaves coming from outer space. The hypothesis is raised that man responds to his surrounding envelope of environmental radiowaves with an accelerated life--increase in average growth, speeded up achievement of sexual maturity. The organism evaluates, as it were, the changed environment and compensates for the change of speeding up its physiological process--this adaptation being then passed on to the offspring. The radiobackground is seen to slow down growth and development of mammals; the latter then speed up their life activity. Man is constantly creating more and more radiowaves--radar, relaystations, navigational aids, communications, space satellites--which presumably add to the acceleration explosion. Artificial electromagnetic waves are certainly not about to decrease in volume; this may affect biorhythms and diurnal rhythms. It is indicated that it is difficult to say whether this latter effect will be good or bad for mankind.

[324-8586]

PHYSIOLOGY

UDC 612.27

DYNAMICS OF SATURATION OF BRAIN WITH OXYGEN UNDER INCREASED PRESSURE

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR in Russian Vol 29, No 12, Dec 83
(manuscript received 22 Mar 83) pp 1529-1535

KISLYAKOV, Yu. Ya. and LUCHAKOV, Yu. I., Laboratory of Blood Transport Function, Institute of Physiology imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad

[Abstract] In light of the extensive use of hyperoxic gas mixtures in aerospace and underwater activity and clinical medicine, it is important to know how that use affects the body. Analysis has been made in this paper of the dynamics of distribution of oxygen pressure (pO_2) in the brain under increased partial pressures of oxygen in the arterial blood; an evaluation was carried out of the effect--on the level of oxygen saturation of nervous tissue--of basic physiological parameters which determine gas exchange dynamics, parameters such as O_2 content in the arterial blood, rate of flow in the capillaries and density of the capillary net. Methodology used was mathematical in character. Transport of O_2 is analyzed in an idealized space containing a spherical cell of the cortex with parallel-disposed capillaries and surrounding tissues. An equation of diffusion is used to describe change in O_2 pressure, in the brain tissue, with respect to time, taking into account the O_2 -demand of the cell and surrounding tissue. A mathematical model--with respect to time--was constructed based on real-time data. Change of concentration of O_2 in the blood capillary is a function of the rate of blood flow and diffusion of O_2 into the surrounding tissue. A curve of dissociation determines the dependence of O_2 pressure, (pO_2), in the capillary, on the oxygen content under normal conditions; the authors had earlier derived an analytical expression to describe this functional dependence. The differential equations describing conditions of oxygen saturation under changing pressures are subjected here to computer calculations. Distribution of pO_2 in three planar sections of the cell space is diagrammed and graphically presented for normal pO_2 and for step-wise increases in pO_2 . The graphs indicate time required for O_2 saturation of the tissues under the various pressures; that time is a function of all the parameters cited. The authors feel that their mathematical model helps to analyze the processes of O_2 saturation of brain tissue under changes in O_2 content of arterial blood; the model might serve for analysis of saturation of other tissues and with other (inert) gases. Figures 5; references 19: 16 Russian, 3 Western.

[290-8586]

PSYCHOLOGY

PSYCHOLOGY AND PRACTICAL WORK IN AUTOMATED INSTRUCTION

Moscow VOPROSY PSIKHOLOGII in Russian No 6, Nov-Dec 83
(manuscript received 23 May 83) pp 16-17

LYAUDIS, V. Ya. and TIKHOMIROV, O. K.

[Abstract] The new area of automated instruction has caught the interest of psychologists even though the development and utilization of computer equipment for this purpose are handled as a rule by programmers, mathematicians, cyberneticists who base their work on traditional approach to instruction rather than on psychological-pedagogic theories. In the present review, many problems are covered: evaluation of comparative effectiveness of computerized and traditional instruction; interaction between the operators and automatic equipment; organization of data banks and their management; organization and utilization of dialogues; the role of a teacher under conditions of computer learning and organization principles for developers and users of automated instruction systems. The new area in psychology--the psychology of automated instruction--has been stressed as a component in need of greater development. Overall, computer learning requires a much higher level of preparation of the teacher. Computer programs should make it possible to go from a reproductive type of learning to a creative one of both the student and teacher.

References 55: 37 Russian, 18 Western (1 by a Czech author).

[304-7813]

PUBLIC HEALTH

IMPROPRIETIES IN PUBLICATION OF SCIENTIFIC BOOKS CONDEMNED BY CPSU
PARTY CONTROL COMMITTEE

Moscow SOVETSKAYA ROSSIYA in Russian 31 Jan 84 p 2

[Article: "Discussed by the Party Control Committee Under the CPSU Central Committee--In the Footsteps of Articles in SOVETSKAYA ROSSIYA"]

[Text] The Party Control Committee under the CPSU Central Committee checked the facts contained in articles in the newspaper, SOVETSKAYA ROSSIYA, on 21 September and 23 December 1983 (articles entitled "Hypnosis With Forgery" and "Is the Hypnosis Continuing?"), concerning the improper behavior of Ye. Ch. Novikova, deputy USSR minister of health and certain other workers.

The investigation revealed that Novikova sometimes resorted to improper methods of management and was disrespectful about critical comments. Her name often appeared, without sufficient grounds, on the title pages of books and under the titles of various articles, which are actually authored by scientists and employees of subordinate institutions.

The investigation also established that Yu. Ye. Vyrenkov, chief of the USSR VAK [Higher Certification Commission] department displayed lack of interest in checking letters about falsification of experimental data in the dissertation submitted for defense by A. S. Osmolovskiy, as a result of which the VAK Presidium approved an illegal decision to confer the scientific degree of doctor of medical sciences to the candidate. Subsequently this decision was reversed.

Having examined the results of its investigation, the Party Control Committee under the CPSU Central Committee passed a resolution, in which it stated that the USSR Ministry of Health did not provide proper control over the performance of scientific councils of subordinate institutes, publication of medical literature, adherence to ethical and moral standards in publishing printed works by administrative personnel in the system, and demanded that steps be taken to eliminate the existing flaws.

Considering the fact that Ye. Ch. Novikova, member of the CPSU, was relieved of her post because of the committed abuses and that she has made a correct assessment of her faults, the Party Control Committee under the CPSU Central Committee has declared a strict reprimand to her with a report on her record. The committee also named P. N. Burgasov and Yu. F. Isakov, deputies of the USSR minister of health and members of the CPSU, who cooperated in the

unscheduled publication of the monograph by Novikova and Osmolovskiy, for their improper conduct. The attention of the ministry's party committee was called to the lack of necessary control over adherence by communists in the system to party and state discipline.

A strict reprimand was delivered, with pertinent entry on his record, to M. I. Balabolkin, member of the CPSU, who is the chief editor of Meditsina Publishing House. The attention of the USSR State Committee for Publications was called to the serious flaws in the performance of this publishing house, and it was asked to take steps to put the release of medical literature into proper order.

The committee reproved Comrade Yu. Ye. Vyrenkov, CPSU member, chief of the certification department in the specialty of medical sciences of the USSR VAK, for his disinterested attitude toward following up on letters and statements of working people.

The editorial office of SOVETSKAYA ROSSIYA received replies signed by Yu. P. Lisitsyn, corresponding member of the USSR Academy of Sciences and director of Meditsina Publishing House, I. A. Sidorov, secretary of the Party Buro and T. A. Petrova, chairman of the trade-union committee, as well as Yu. M. Lopukhin, academician of the USSR Academy of Medical Sciences, rector of the Second Moscow Medical Institute. The responses offered a basic evaluation of the facts exposed in this newspaper, outlined steps to preclude instances of publishing books, such as described in the SOVETSKAYA ROSSIYA articles and any possibility of defending dissertations that did not conform to the required standards.

10,657
CSO: 1840/313

WHO INVENTED VALIDOL

Moscow GUDOK in Russian 1 Feb 84 p 4

[Article by O. Kameneva]

[Text] There are 444 pharmacies in Moscow. It is doubtful that any other city could boast of so many pharmaceutical enterprises. We have become so accustomed to their immediate, hourly assistance, that, receiving a bottle or package with the necessary medicine from the pharmacists, we don't even remember those who are responsible for the existence of these medicines. And I thought of them, having swallowed at the usual time a pill for headache and having felt relief...

And so I set off for the address "Pharmaceutical Way, House No 1" and found myself at a pharmaceutical factory which is the only one in the capital and the largest in the country. It turned out to be easy enough to find it among the cluster of industrial enterprises. The barely perceptible aroma of menthol led me to the entrance better than any other indicator.

A couple of bottles of zelenka were on Director A. Smirnov's table. And, judging from the way he fondly looked at them and livingly turned them over in his hands, I began to suspect that they, in a certain way, were the pride of this enterprise. And I was not mistaken.

"We hope that the shortage of zelenka in Moscow will soon be over," declared Aleksander Vasil'yevich. He explained: "We are introducing a new automated line. It will almost completely exclude the manual labor of our workers. If you could see what the zelenka packing shop is like! Judged on the splash of color, the tables and equipment are not inferior to a forest glade on a sunny day. But the brilliant green solution is a strong agent. Thanks to our rationalizers--Pavel Kuz'mich Starostin and Ivan Semenovich Lashkov--the line was invented and assembled by them. By the way, Pavel Kuz'mich is our inexhaustible innovator, one could say, of the legend of pharmacopoeial production. Let us say that the casting machine of Starostin has been efficiently and irreplaceably operating at all the pharmaceutical enterprises of our country for a decade. Or, do you remember the tables in pharmacies behind which pharmacists work? With the ventilators? His invention!"

"Excuse me, but then how old is this structure?"

"Starostin proposed it in 1931. Previously, pharmacists worked standing behind large bureaus. Tiresome and uncomfortable. If Starostin hadn't helped them, there's no telling how long they would have continued standing."

Having noticed my confusion, the director understood the reason for it. "Starostin is 94 years old. But even the young can envy his acute intellect and rationalization ability. If he has an idea, it would take about 20 years to instill it into us. Almost all technical novelties of the factory are from his hands. Shall we take a look?"

And we set off for the shop. It's amazing, but you don't perceive the medicine smells at all. I asked about it and Smirnov indicated the corridor ceilings, replaced by metal netting, behind which are heavy-duty exhaust pipes.

"We have 115 ventilating systems," he said. "They occupy the entire fifth technical floor. You understand yourself that the air must be sterile and we worry about the health of our workers."

We are going along the wet floor on our tiptoes, skirting the cleaning women with mops (the floor is cleaned here several times a day), and we passed through a door with the sign "Pill Shop".

Glucose was on the production line today. I say "today" because yesterday they were preparing headache pills on the same equipment, and tomorrow, say, they'll be doing terpin hydrate. The volume of production of each item is not great--no more than 120 kilograms. This factory is a sensitive barometer of our health. It is in a position to react to an increased demand for one or another drug literally on the reckoned days: the plan for output of production is composed in relation to demands of pharmacies. Well, and of course, the factory operates according to season: in the summer, gastro-intestinal drugs are needed more, in the winter--fibrifugal drugs and in the spring and fall--anti-influenza drugs.

Aleksander Vasil'yevich talked and I observed the birth of pills: drying of powders to the specified dampness, granulation, compression and packaging in clear cellophane coating.

"Would you like a glucose pill?" the director offered, and I put a still "warmish", just off the conveyer, sweet pill on my tongue. Thus, having "fortified" ourselves, we set off further into the galenicals shop, which resembles, most of all, a miniature oil-refinery plant.

Heavy-duty vats of reactors, percalators and filters are connected by a countless number of hoses and pipes which somewhere above suddenly unexpectedly form a mesh of glass conduits. In percalator-settling tanks, valuable medicinal substances are extracted from roots and herbs, the original raw material (which is supplied by approximately 100 of our country's pharmaceutical plants). This is how extracts and tinctures of lily of the valley with valerian, colendulin, hawthorn and water fennel are prepared. The factory yearly cultivates production of galenical homeopathic drugs which are so popular with Muscovites. This enterprise supplies the capital's pharmacies

with 32 million bottles a year. But then, its conveyors also put out bottles of ointments, rubbing oils, the zelenka which I already mentioned, iodine, hydrogen peroxide, all kinds of alcohol, drops, rinses, syrups and oils--in all more than 130 items. And control over the quality of each drug and the original raw material must be the strictest, because this concerns the health and lives of people.

This is monitored, as in all enterprises, by the OTK [expansion unknown, possibly, continuous control unit], in which there are 12 specialists with higher education--chemists, biologists, bacteriologists. They have the most modern equipment at their disposal, from microscope to spectrophotometer. And so it was all the more unexpected to hear from them such a mysterious phrase: "Today the standard is normal. Three frog units..."

The department head, L. Kuz'mina, dispelled this middle-ages mysticism. It so happens, that they conduct a biological analysis of the cardiovascular drugs digitalis, lily of the valley and adonis on male frogs. Ten frogs, having received injections of the medicines, must, since it is not sorrowful, die. This is not all at once, but only three an hour. If the heart stops in four of them, for example, the drug is too strong.

We traveled around the shops, and in this time I came to understand one more law of life in a pharmaceutical factory: they do not rest on their laurels! The factory is not simply an industrial enterprise, but also a large laboratory. Here, in conjunction with the Scientific Research Institute of Pharmacology, they have developed and introduced such widely known drugs as pircofin, menovazin, "tiger" oil, ephedrine solution, tincture of birch fungus, sunoref, ioduxen and Zelenin drops. Many of them "take root" so much in medical practice, that they are "taken away" into production in medicinal drug plants. That is how it happened, for example, with the famous validol. Just who was its "author" is not known. But is that really so important? In my opinion, more important are those words which I heard from almost everyone with whom I talked at the enterprise.

They said: "Be healthy!", and I believed that they will do everything to make it so.

12473
CSO: 1840/312

POOR MEDICAL CARE IN KAZAN AND ZELENODOLSK CONDEMNED

Moscow TRUD in Russian 5 Feb 84 p 2

[Article: "A Case History--Steps Have Been Taken"]

[Text] Under this heading, information was published on 20 November in the newspaper, TRUD, about the offhanded attitude of emergency department physicians and the 18th polyclinic in the city of Kazan, and the delay in rendering care to patient N. Mukhutdinova led to a tragedy.

The chief of the main administration for therapeutic and preventive care of the RSFSR Ministry of Health, S. Kulagin, informed the editorial office that the facts presented in the article entitled "A Case History," were checked by the commission of the RSFSR Ministry of Health. The findings were discussed at the board [meeting] of the RSFSR Ministry of Health. It was noted that gross diagnostic and management errors were made at all stages of rendering medical care to patient N. Mukhutdinova at the therapeutic and preventive institutions of Kazan. Because of an irresponsible and careless attitude, and inadequate qualifications of emergency service physicians, as well as those at Polyclinic No 18 and Infectious Hospital No 1, the diagnosis of acute appendicitis for this patient was made only on the 6th day of illness.

A check in Kazan and Zelenodolsk revealed that there were serious flaws in the performance of polyclinics, emergency service and surgical departments of hospitals concerning medical care of patients with acute surgical diseases.

By order of the RSFSR Ministry of Health, I. Mukhutdinov, Tatar minister of health, M. Ziyeva, deputy minister for personnel and Kh. Khamitov, rector of Kazan Medical Institute were reprimanded, and a strict reprimand was made to M. Rozengarten, chief surgeon of the Tatar Ministry of Health.

By order of the municipal health department of Kazan, O. Lyalyakov, physician at the emergency medical aid station, and N. Gimatinova, internist at Polyclinic No 18 and B. Kuz'min, physician at the same polyclinic were relieved of their duties. D. Khayretdinova, department head at the First Infectious Hospital, Dr I. Ordyntseva and F. Agzamova, internist at Polyclinic No 18 were strictly reprimanded; F. Sabitova, chief of the Volga Region Health Department in Kazan, Ye. Yefremov, chief physician of that city's emergency medical station and Dr. N. Ivanova, Z. Talinova, chief physician at Municipal Clinical Hospital received

a reprimand, while R. Mukhutdinova, chief of the municipal health department was reprimanded.

By decision of the ispolkom of the Kazan Municipal Council of People's Deputies, Sh. Karatay, chief of public health department, was reprimanded. The files concerning doctors O. Lyalyakov, F. Agzamova and N. Gimatdinova were sent by the health department to the procuracy of the city of Kazan.

Steps have been taken to improve organization and quality of medical care for patients with acute surgical diseases.

10,657
CSO: 1840/313

TRAGEDY IN WAKE OF PHYSICIANS' NEGLIGENCE

Moscow TRUD in Russian 20 Nov 83 p 2

NADEZHINA, N. and UKHOV, Special correspondents of TRUD, Kazan

[Abstract] This newspaper article reports a complaint, received from workers at a computer factory, that the death (from sickness) of a coworker had been due to negligent and indifferent response to her plight by the Skoraya Pomoshch [First Aid Team] and by the uchastok physicians of the 18th polyclinic in Povol'zhe Rayon of Kazan City. In considerable detail, listing the names of responsible medical personnel and services, the story of lax response to a call for first aid, mis-diagnoses (five different ones over a five-day period), neglect of consultative opportunities, improper therapy, is presented. The newspaper reiterates the uniqueness of the profession of a physician. It outlines the system of medical service in the nation: uchastok physicians, skoraya pomoshch, sanitary aviation service, institutes for the advanced training of physicians, clinics--all for qualifying the physician for his work. Instances where the system has worked are described. The reasons why it did not work in Kazan are ticked off, essentially, to neglect and inadequate training. To prevent a recurrence of what is considered a rare case, the situation has been analyzed thoroughly, deficiencies are to be identified, and remedied, and medical ethics are to be reinforced.

[309-8586]

UDC 615.916:546.16].085.31:547.466.64

THERAPEUTIC AND PROPHYLACTIC EFFECTIVENESS OF GLUTAMIC ACID IN INHALATION TOXICITY OF INORGANIC FLUORINE COMPOUNDS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 12, Dec 83 (manuscript received 29 Jun 82) pp 26-29

SHUGAYEV, V. A., Institute of Biophysics, USSR Ministry of Health, Moscow

[Abstract] Glutamic acid was evaluated for its therapeutic and prophylactic effectiveness in mice and rats subjected to respiratory challenge with HG, MoF₆ or WF₆. Animals exposed to the noxious agents for 2 hr (110 mg/m³ of F⁻ concentration) showed 100% mortality regardless of pre- or post-exposure glutamic acid treatment. Untreated animals exposed to 30-40 mg/m³ of F⁻ for

4 h/day for 10 days showed 100% mortality, which was reduced to 20% by glutamic acid treatment. In long-term studies (5 h/day exposure to 1.5 mg/m³ of F⁻ for 4 months) glutamic acid was found to enhance urinary excretion of F⁻, promoted normalization of tissue oxygen metabolism, normalized blood chemistries, alleviated F⁻ intoxication symptoms, and reduced mortality. On the basis of these observations it appears that glutamic acid may have a role in the treatment and prevention of F⁻ intoxication. Figures 1; references 10: 8 Russian, 2 Western.

[291-12172]

WAYS OF LOWERING CHILDREN'S MORBIDITY AND MORTALITY

Turkmen MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 10, Oct 83
(manuscript received 20 Jan 82) pp 3-7

MAKHMUDOV, O. S., professor, Scientific Research Institute of Pediatrics, USSR Ministry of Health

[Abstract] One of the most important tasks of the social program is the creation of favorable conditions for population growth, education of the new generations and the improvement of the health of mothers and children. Due to the social and medical improvements, the morbidity of children in Uzbekistan has dropped drastically in recent years. Progress was achieved in construction of new facilities and in providing the population with gynecologists and pediatricians to work in these facilities. But there are still some problems. The leading role in lowering morbidity and mortality among children must be played by ambulatory-polyclinical service. The health of mothers is directly related to the health of their offspring. Yet only 22% of child-bearing women turn to gynecologists for routine medical examinations. Many of the women suffer from extragenital disorders and their children are at higher risk of becoming sick or even disabled. Attention should be directed to prenatal care of mothers and children. Other measures should be aimed at improving prenatal care by medical personnel. A number of other deficiencies in medical care of the newborn are listed with corresponding corrective measures.

[300-7813]

UIC 616-022.913.21-083.03

EMERGENCY AID AFTER POISONING BY VENOM OF ARTHROPODS

Moscow MEDITSINSKAYA SERVISA in Russian No 11, Nov 83 pp 26-30

POTAPCOVA, T. M. and POTAPOV, A. V., Leningrad Sanitation and Hygiene Medical Institute

[Abstract] First aid treatment to be provided by nurses and fieldbards after poisonings by venoms of USSR arthropods is discussed. Arthropods discussed include: the karakurt spider (*Latrodectes tredecimguttatus*); tarantulas (*Trochosa singoriensis*); scorpions (*Buthus cupreus* and *Buthus granulatus*);

Scolopendra cingulata; and Phalingida (Galeodes aranoides, Galeodes caspius, Galeodes fumigatus). Specific first aid measures to be performed to treat poisonings from each of these arthropods are presented.
[339-2791]

UDC 617-082+614.2

PROVISION OF SURGICAL AID IN MUNICIPAL POLYCLINICS AND ITS COST

Kiev KLIN'CHESKAYA KHIRURGIYA in Russian No 11, Nov 83
(manuscript received 25 Apr 83) pp 51-52

SNEGUR, Ye. A., KHOKHOLYA, V. P., KOSTRITSA, T. B. and GÁNKICHEVA, G. D., Kiev Scientific Research Institute of General and Communal Hygiene; Kiev Scientific Research Institute of Clinical and Experimental Surgery

[Abstract] Provision of surgical aid and its cost from 1979-1981 in 24 municipal polyclinics of various regions of the UkrSSR and Kiev are described and discussed. Data were obtained from a specially-developed "Chart of the Type and Volume of Work of the Polyclinic", filled in at the institutions being studied. The level and quality of surgical aid met the norms set in the polyclinics studied with some institutions surpassing these norms. Cost of polyclinic surgical aid was calculated in terms of expenditures on salaries, cost of medicines and dressing materials and amortization of equipment. Great variations in indicators of medical work performed (number of visits per inhabitant per year, outpatient visits, number of physical examinations, etc.) and in economic indicators (cost of one visit, cost of polyclinic treatment of one patient for a year, etc.) for the various polyclinics studied showed the possibility for improving the organization of surgical aid by the polyclinics, the quality of aid rendered and the use of financial, personnel and material resources available. References 5 (Russian).

[339-2791]

UDC 616.6-053.1/-055.5/.7-082.4

HEREDITARY AND CONGENITAL NEPHROPATHIES AT SPECIALIZED NEPHROLOGICAL CLINICS IN MOSCOW AND KOSICE

Moscow VOPROSY OKHRANY MATERINSTVA I DETSTVA in Russian No 12, Dec 83
(manuscript received 3 May 82) pp 17-21

IGNATOVA, M. S., KLUKA, V., DECTYAREVA, E. M., PAVKOVCHEKOVA, O., FOKEYEVA, V. V. and TISHLER, V., Moscow Scientific Research Institute of Pediatrics and Children's Surgery (Director- Professor Yu. Ye. Vel'tishchev, corresponding member USSR Academy of Medical Sciences) RSFSR Ministry of Health, University imeni Safarik, Kosice, CSSR

[Abstract] Analysis of material from examinations of 1631 children, performed at the RSFSR Ministry of Health, Moscow Scientific Research Institute of Children's Surgery (department of nephrology) and of 1444 children with

diseases of the urinary system treated in Kosice (Eastern Slovakia) was used to determine the incidence and structure of congenital and hereditary nephropathies in children. These data revealed a great diversity of nosological forms of renal pathology, differing significantly according to the role of environmental and genetic factors in their formation. Data covering almost 10 years of observation showed the high frequency of congenital and hereditary diseases of the kidneys in the structure of pathology of organs of the urinary system and also the broad spectrum of nephropathologies related to this group. Differences in structure of congenital and hereditary nephropathologies in Moscow and Kosice were attributed to different diagnostic techniques used or to genotypical features of the children studied. References 14: 9 Russian, 5 Western.

[340-2791]

UDC 577.391:663.12/14

STUDY OF LIPID FATTY ACIDS COMPOSITION OF YEASTS DIFFERING IN
RADIOSENSITIVITY

Moscow BIOLOGICHESKIY NAUKI in Russian No 11, Nov 83
(manuscript received 19 Apr 82) pp 28-31

GONCHARENKO, Ye. N., GUDZ', T. I., KOVALEVA, A. K., YU'KOVICH, A. K. and
BARATOVA, L. A., Department of Biophysics, Moscow State University imeni
M. V. Lomonosov

[Abstract] Yeast-lipid composition of fatty acids was determined in a study of factors which cause differences in the quantity of hydroperoxides in yeast cells with use of cells of various radioresistance within limits of one species (*S. cerevisiae*, *P. guilliermondii* and *P. pinus*). The relative level of unsaturated fatty acids is approximately the same for the total lipids of all strains studied. No direct relationship between radiosensitivity of yeast cells and the polyunsaturated fatty acids level in them was found although lipids of less radioresistant cells of each yeast species studied contained a high level of hydroperoxides of fatty acids. It was assumed that the fatty acid composition of membrane lipids and the polyunsaturated fatty acid level have no significant effect on formation of radioresistance of the cells.
References 11: 5 Russian, 6 Western.
[337-2791]

VETERINARY MEDICINE

UDC 619:616.981.51-07:634.4

DIAGNOSIS OF ANTHRAX IN PIGS

Moscow SVINOVODSTVO in Russian No 11, Nov 83 pp 27-28

IPATENKO, N. and ANTONYUK, V., All-Union Scientific Control State Institute of Veterinary Preparations and GUSHCHIN, V., Main Administration of Veterinary Medicine, USSR Ministry of Agriculture

[Abstract] Clinical symptoms of anthrax in pigs differ considerably from manifestations in other animals. They exhibit drowsiness, nausea, some temperature rise, diarrhea or constipation, increased respiratory rate and usually show no thirst even during hot days. Several cases were reported to illustrate information from specific instances which could be applied universally. It was stressed that proper diagnostic approach was very important in preventing the spread of this disease. Examination of internal organs is very important; this concerns specifically lymphatic nodes and parenchymatous organs. Even minor changes in pathology should be registered and examined closely to exclude the possibility of anthrax.

[284-7813]

UDC 619:616.988.43:636.4

FOOT AND MOUTH DISEASE AND ITS PROPHYLAXIS IN PIG BREEDING FARMS

Moscow SVINOVODSTVO in Russian No 11, Nov 83 pp 28-29

ANTONYUK, V. and KRUGLIKOV, B., All-Union Scientific Research Institute of Veterinary Preparations

[Abstract] Foot and mouth disease is an acute infectious disease attacking cattle, pigs, lambs and goats. It is of viral origin, principally of the A and O type. Recovery from one type infection does not protect from infection by another type of the virus. It can be spread by saliva, urine, feces, and even through exhaled air, although in pigs it enters the system principally through the alimentary tract. It is highly virulent. Clinical symptoms in pigs have been described. During the treatment stage, quarantine of the suspected animals is advocated along with serum vaccination with material obtained from animals recovered from the specific viral type infection. Closed-type breeding facilities were recommended as one possible parameter of preventive measure against this infection. A massive prophylactic vaccination program is required to control this disease

[284-7813]

UDC 619:614.31.4:636.4

EXPERIENCE GAINED IN ORGANIZING VETERINARY MEASURES ON A FARM-COMPLEX

Moscow SVINOVODSTVO in Russian No 1, Jan 84 pp 33-34

KUTUZOV, L., Chief Veterinary Physician at the Pig Farm-Complex imeni 60-Anniversary of BSSR, Borisov Region, Minsk Oblast

[Abstract] Veterinary service on a breeding farm-complex has as its main goal: assurance of well-being of animals and increased productivity. One of the most important tasks of such a complex is to propagate disease-free animals. Early diagnosis is one of the most effective prophylactic measures for noninfectious diseases. For this purpose every 15 days blood samples are collected from a representative group of sows. The most effective measure in prophylactic approach is the intensification of active resistance to the disease which may be achieved by increased intake of vitamins. A number of standard operating procedures were reported concerning sows and their offspring. The deficiencies in this program include inadequate supply of good quality food and various shortcomings in availability of medications, especially against pneumonia, enteritis and dysentery.

[269-7813]

UDC 619:614.31.4:636.4

EXPERIENCE GAINED IN ORGANIZING VETERINARY MEASURES ON A FARM-COMPLEX

Moscow SVINOVODSTVO in Russian No 1, Jan 84 p 34

LUSHCHENKO, V., Chief Veterinary Physician of the Pig Farm-Complex "Prikarpatskiy", Kaluga Rayon, Ivano-Frankovskaya Oblast

[Abstract] The Sovkhoz-combine "Prikarpatskiy" began operations in 1979. The experience gained in adapting sows from other location to the new facility is reported. IM injections of calcium gluconate appeared to solve most of the health problems. To improve fertility, sanitary measures were modified: lighting, water supply, use of vitamins and various stimulators were experimented with. During hot summer days the males were treated with cold showers to prevent necrospermia and aspermia. To improve development of young piglets, they were fed specially wetted feed rather than dry fodder.

[269-7813]

PATHOGENICITY OF CERTAIN SWINE ENTEROVIRUSES

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR. SERIYA BIOLOGICHESKIKH I KHIMICHESKIKH NAUK in Russian No 6, Nov-Dec 83 (manuscript received 17 Dec 82) pp 63-64

BURSUK, I. F.

[Abstract] Three serovars (F_7 , F_{34} , V_{13}) of swine enteroviruses were tested on four-day-old piglets to further define the pathogenicity of the various serologic strains for the very young animals and the possible threat that they may constitute in pig raising. The clinical course of the infections showed considerable variability, but all animals succumbed within five to seven days of infection. In general, F_7 infection was marked by diarrhea and its complications terminating in loss of appetite, F_{34} infection was complicated by considerable emesis, and V_{13} infections were marked by central nervous system involvement. References 3¹³ 2 Russian, 1 Western.

[301-12172]

UDC 636.4:61-08

DIAGNOSIS OF TRANSMISSIVE VIRAL GASTROENTERITIS OF SWINE BY IMMUNOCYTOLYSIS

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 5, May 83 (manuscript received 18 Aug 81) pp 139-140

NESTERENKO, V. F. and VORONIN, Ye. S., All-Union Institute of Experimental Veterinary Medicine, Moscow

[Abstract] Details are provided on an immunocytolysis method for the identification of transmissible swine gastroenteritis virus which, in terms of specificity and sensitivity, is equivalent to the more commonly employed neutralization and immunofluorescence tests. The method utilized continuous pig renal cells and a specific antiserum + complement complex to lyse the infected cells. The immunocytolysis method is remarkable for its speed, in that viral antigen can be detected 3-6 h after infection of the cells. References 6 (Russian).

[298-12172]

UDC 578.825.1

ISOLATION OF HIGHLY PURIFIED AND CONCENTRATED VIRUS OF AUJESZKY'S DISEASE

Moscow DOKLADY VASKhNIL in Russian No 10, Oct 83
(manuscript received 27 Apr 83) pp 37-39

PROSTYAKOV, A. P., TSYGANNOVA, S. I., ARSENT'YEVA, T. M., PROKHOROVA, E. M.
and YERMAKOVA, G. I., All-Union Order of the Labor Red Banner State Scientific
Control Institute of Veterinary Preparations

[Abstract] Herpes viruses, including Aujeszky's Disease (AD) virus, are rather labile and difficult to purify. The goal of the present study was to develop a method for isolation and concentration of AD virus. Chick embryo cell culture infected with AD virus was subjected to differential centrifugation for 15 min at 1500 G and 20 min at 17000 G, followed by precipitation with 6000 MW polyethylene glycol, centrifugation through 30% saccharose and saccharose density gradient (15-30%) at 17000 G for 140 min. The virus-containing zone was eluted in the 16-18 fractions. After addition of a phosphate buffer and centrifugation at 27000 G, a highly purified concentrate of AD virus was obtained. Figures 2; references 6: 2 Russian, 4 Western.
[296-7813]

UDC 578.826.1:578.222

CLONING OF VIRION DNA FRAGMENTS OF ADENOVIRUS CELO CONTAINING HEXON GENE AND ONCOGENE

Moscow DOKLADY VASKhNIL in Russian No 12, Dec 83
(manuscript received 6 Jul 83) pp 31-33

GRABKO, V. I., LUNIN, V. G., TIKHONENKO, T. I., FOMINA, N. V. and KARELIN, V.P.,
Moscow Order of the Labor Red Banner Veterinary Academy imeni K. I. Skryabin;
Scientific Research Institute of Medical Enzymology, USSR Academy of Medical
Sciences; Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical
Sciences

[Abstract] Adenoviruses cause many diseases among agricultural animals and fowl. The avian adenovirus CELO (chick embryo lethal orphan) was investigated. The ECORI-fragments of CELO adenovirus were cloned in plasmid pBR 325, two of which were of special interest. Fragment C contains hexon gene and it could

be used for determination of nucleotide sequence coding type-group and species specific epitopes in hexane gene as well as in genetic engineering effort to produce vaccines and immunodiagnostic reagents based on these fragments. Fragment D contains sequences determining oncogenicity of CELO adenovirus useful in molecular-biological studies of adenoviral infections. Figures 3; references 10: 1 Russian, 9 Western. [286-7813]

CONFERENCES

UDC 613.6:061.3(470.311-25)"1983"

ANNUAL SCIENTIFIC CONFERENCE OF MOSCOW HYGIENISTS ON MOST IMPORTANT PROBLEMS OF HYGIENE OF LABOR (MOSCOW, MAY 1983)

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 2, Feb 84 pp 59-60

ARKHINOV, A. S., Moscow

[Abstract] Conference participants included associates of the Institute of Hygiene of Labor and Occupational Diseases of the USSR Academy of Medical Sciences, the Central Institute for the Advanced Training of Physicians, 1st Moscow Medical Institute, 2d Moscow Medical Institute, the All-Union Central Institute of Labor Protection of the All-Union Central Trade-Union Council, the All-Union Scientific Institute of Railroad Hygiene, the USSR Ministry of Health, the Moscow City Sanitary-Epidemiological Station and Moscow Rayon Sanitary-Epidemiological Station. Discussions at the conference included: problems of state sanitation supervision, associated with further improvement of conditions of work; health problems related to the use of metals in Soviet industry; a new express method of hygienic evaluation of fibrogenicity of dusts; subcellular mechanisms of action of silicon dioxide associated with its initiation of free-radical processes; history of development of locomotive railroads in the USSR and health problems related to it; contamination of the work environment by lead and cadmium in the artificial leather industry; hygienic assessment of the technological process of tempering steel parts of machines; physiological and hygienic evaluation of conditions of work in reinforced concrete plants; effectiveness of use of ovens for catalytic after-burning of emissions in polyethylene film production; hygienic evaluation of work conditions in some types of lamp producing plants; evaluation of a new process of spray coating polymer materials on metal surfaces; rationalization of the work of pregnant women in pastry and printing enterprises; control of chemical contamination of work zones; use of a two-dimensional, non-linear approximation for quantitative assessment of the association between worker morbidity and the conditions of work; vital problems of personal hygiene of labor; conditions of work under permanent magnetic fields and conditions of work in tube making departments.

[331-2791

CSO: 1840/001

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